

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)	
)	
Application of Cellco Partnership d/b/a)	WT Docket No. 12-4
Verizon Wireless and SpectrumCo, LLC)	
For Consent To Assign Licenses)	
)	
Application of Cellco Partnership d/b/a)	
Verizon Wireless and Cox TMI Wireless, LLC)	
For Consent To Assign Licenses)	

JOINT OPPOSITION TO PETITIONS TO DENY AND COMMENTS

**CELLCO PARTNERSHIP D/B/A
VERIZON WIRELESS**

John T. Scott, III
Michael D. Samsok
Katharine R. Saunders
VERIZON
1300 I Street, NW
Suite 400 West
Washington, DC 20005
(202) 589-3760

Michael E. Glover
Of Counsel

Attorneys for Verizon Wireless

SPECTRUMCO, LLC

Michael H. Hammer
Michael G. Jones
Mia Guizzetti Hayes
Brien C. Bell
WILLKIE FARR & GALLAGHER LLP
1875 K Street, NW
Washington, DC 20006
(202) 303-1000

Attorneys for SpectrumCo

COX TMI WIRELESS, LLC

J.G. Harrington
Christina H. Burrow
Michael Pryor
DOW LOHNES PLLC
1200 New Hampshire Avenue, NW
Suite 800
Washington, DC 20036
(202) 776-2000

Attorneys for Cox Wireless

March 2, 2012

TABLE OF CONTENTS

INTRODUCTION AND SUMMARY	1
I. THE LICENSE ASSIGNMENTS WILL SERVE THE PUBLIC INTEREST.....	5
A. Recent Data on Growing Demand for Mobile Broadband Confirm the Need for the Efficient Assignment of Spectrum to Serve Consumers.	5
B. The License Assignments Are Precisely the Use of the Secondary Market that the Commission Has Said Will Help Meet Mobile Broadband Demand and Achieve the Objectives of the National Broadband Plan.	8
C. Verizon Wireless Needs Spectrum to Provide the Necessary Capacity to Continue to Deliver the Service Its Customers Expect.	12
D. Verizon Wireless’ Industry-Leading Spectral Efficiency Disproves Allegations of Warehousing and Belies Claims that Engineering Solutions Alone Can Solve Its Capacity Constraints.	23
E. The Commission Has Repeatedly Found that Assignments of Spectrum Not Being Used to Provide Service to Customers Serve the Public Interest by Putting Spectrum to Work.	31
1. SpectrumCo Complied with All Relevant Commission Rules.	33
2. Cox Similarly Complied With All Relevant Commission Rules.	37
3. SpectrumCo and Cox Wireless Have Fully Complied with the Commission’s Buildout Rules.	40
II. THE TRANSACTIONS WILL NOT REDUCE COMPETITION.	41
A. The License Assignments Will Not Cause Potential Competitive Harms in Any Affected Local Wireless Market.	42
B. Competition Will Remain Robust Even in the Few Areas Where the Screen Is Exceeded.	45
C. Commenters Fail to Demonstrate Any Competitive Harm at a National Level.	47

D.	The Commission Should Reject Proposals to Develop New Spectrum Limits or Tests.....	52
E.	Claims Suggesting that Alternative Buyers Would Better Serve the Public Interest Must Be Rejected.	63
F.	The Remaining Issues Raised by Commenters Are Not Specific to the License Assignments Under Review and Should Be Rejected.....	64
III.	THE COMMISSION DOES NOT REVIEW AGREEMENTS THAT DO NOT INCLUDE LICENSE TRANSFERS, AND IN ANY EVENT THE COMMERCIAL AGREEMENTS ARE BEING REVIEWED BY THE DEPARTMENT OF JUSTICE...	70
A.	The Commission Has Consistently Declined to Review Business Agreements Not Involving Transfers of Commission Authorizations.....	71
B.	The Commission Also Should Not Review the Commercial Agreements Because They Are Being Fully Reviewed by the Department of Justice.	75
C.	Commenters’ Other Proposed Bases for the Commission to Review the Commercial Agreements Are Meritless.....	76
D.	Commenters Supply No Justification for Requiring Submission of the Commercial Agreements in Unredacted Format.	79
	CONCLUSION.....	80

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)	
)	
Application of Cellco Partnership d/b/a)	WT Docket No. 12-4
Verizon Wireless and SpectrumCo, LLC)	
For Consent To Assign Licenses)	
)	
Application of Cellco Partnership d/b/a)	
Verizon Wireless and Cox TMI Wireless, LLC)	
For Consent To Assign Licenses)	

JOINT OPPOSITION TO PETITIONS TO DENY AND COMMENTS

INTRODUCTION AND SUMMARY

The proposed assignments of Advanced Wireless Services (“AWS”) licenses from SpectrumCo, LLC (“SpectrumCo”) and Cox TMI Wireless, LLC (“Cox Wireless”) to Cellco Partnership d/b/a Verizon Wireless (“Verizon Wireless”) are squarely in line with Administration and Commission policy: to ensure that spectrum is put to use to satisfy the American public’s rapidly growing demand for broadband services.¹ The license assignments present compelling public-interest benefits and no countervailing harms.

¹ See Application of Cellco Partnership d/b/a Verizon Wireless and SpectrumCo LLC for Consent to Assign Licenses, WT Docket No. 12-4, File No. 0004993617 (filed Dec. 16, 2011) (seeking consent to assign 122 Advanced Wireless Services licenses to Verizon Wireless from SpectrumCo) (“Verizon Wireless-SpectrumCo Application”); Application of Cellco Partnership d/b/a Verizon Wireless and Cox TMI Wireless, LLC for Consent to Assign Licenses, WT Docket No. 12-4, File No. 0004996680 (filed Dec. 21, 2011) (seeking consent to assign 30 Advanced Wireless Services licenses to Verizon Wireless from Cox Wireless) (“Verizon Wireless-Cox Wireless Application”).

The license assignments are good for consumers.

- The license assignments will put currently unused spectrum to productive use for the benefit of consumers as part of the first nationwide 4G LTE network.
- By supplying additional spectrum capacity, the license assignments will accommodate customers' rapidly growing data demands for broadband devices like smartphones and tablets and bandwidth-intensive applications such as video streaming and cloud computing. As a result, tens of millions of consumers, businesses, and public safety and other government customers who choose Verizon Wireless to obtain high-speed broadband will continue to receive the quality service they expect.

The license assignments are grounded in sound spectrum policy.

- The license assignments are in line with the Commission's objective of encouraging use of secondary markets to assign spectrum to where it can be put to use to serve customers and benefit the public.
- The license assignments will not reduce competition or consumer choice in any market, because they include only licenses for currently unused spectrum, and there will be no transfer or combination of any other assets, facilities, customers, or operating businesses.
- The spectrum will be put to use in an already competitive marketplace. At a local level, in more than 98 percent of the counties covered by these Applications, the total amount of spectrum Verizon Wireless will hold after the assignments will be at a level that the Commission consistently has determined does not raise competitive concerns, and thus is not subject to further review. In the remaining counties, multiple competitors are operating, and many more hold unused spectrum. No commenter provides any evidence that consumers or competition would be harmed in those few counties (or anywhere else).

At a national level, approximately three quarters of all “in-screen” spectrum is held by other companies, and even more spectrum is both available and already in use. And Congress recently passed legislation authorizing the Commission to make additional spectrum available for commercial use to serve the growing and evolving demand of consumers.

Commenters supply no factual or legal basis for the Commission to block or to impose conditions on the proposed transactions. None offers any legitimate claims that these spectrum license assignments would violate the Communications Act (the “Act”) or any Commission rule. Many of the allegations are mere speculation, wholly unsupported by facts or data. As the Commission well knows, growth in demand for mobile broadband service is exceeding all expectations. Carriers facing surging demand are striving to accelerate the addition of network capacity just to keep pace. The evidence provided herein demonstrates that Verizon Wireless will not be able to fully meet consumers’ growing demand for mobile broadband with its current spectrum holdings. Despite the company’s significant investment in network efficiencies, skyrocketing demand will overtake its 4G LTE capacity absent additional spectrum resources, which it needs to secure now given that it faces spectrum constraints in its network in some areas as early as 2013 and in many more by 2015.

Recognizing that the transaction comports with the Commission’s policies governing spectrum transfers, some commenters seek to hijack this proceeding for their own competitive purposes. Their requests for new spectrum limits and other restrictions present radical changes to well-settled spectrum policy and merely reflect their parochial vision for the spectrum marketplace. By asking the Commission to consider alternative uses of the spectrum and hypothetical alternative purchasers, commenters would have the Commission ignore the

statutory directive to address the transactions before it, not conjured ones.² They chastise the Commission for not regulating the wireless industry more – criticism that is as meritless as it is irrelevant in a license assignment proceeding. Here, consistent with the Act and its own precedent, the Commission’s review should focus solely on these specific license assignments.

Many commenters make claims that are either irrelevant to this spectrum transaction or beyond the scope of this proceeding. They request conditions to address alleged harms that are not related to the transaction or assert that the Commission should act in this proceeding on pending industry-wide policy issues, many of which are already the subject of adopted or proposed generic rules. Their requests are foreclosed by established Commission precedent.

Finally, despite the invitation of some commenters, the Commission should not review separate commercial agreements that do not involve any license transfers.³ Section 310(d) only permits the Commission to review the spectrum license assignment before it, not other transactions that happen to involve the same parties. The Commission consistently has declined to review business arrangements not implicating its statutory authority, even when (unlike the

² Section 310(d) of the Act prohibits the Commission from considering “whether the public interest, convenience, and necessity might be served by the transfer, assignment, or disposal of the permit or license to a person other than the proposed transferee or assignee.” 47 U.S.C. § 310(d).

³ Comcast Corp. (“Comcast”), Time Warner Cable Inc. (“Time Warner Cable”), Bright House Networks, LLC, and Cox Communications, Inc. (“Cox”) (collectively, the “cable companies”) have each entered into separate commercial agreements with Verizon Wireless, which are not subject to Commission review, that include agency agreements under which the cable companies and Verizon Wireless will sell each other’s services on a market-standard commission basis, with the new subscribers becoming customers of the other service provider (*i.e.*, wireless customers signed up by the cable companies would become customers of Verizon Wireless, and cable customers signed up by Verizon Wireless would become customers of the cable companies). The agreements also provide the cable companies with the future option of transitioning to resale of Verizon Wireless services, offering unique, branded wireless services, and for the establishment of a joint venture to develop innovative ways to integrate wireline and wireless services so that consumers can seamlessly use their services across a variety of devices and screens. These agreements are referred to herein as the “Commercial Agreements.”

Commercial Agreements here) the arrangements bore directly on the reviewable transaction. In any case, the Commercial Agreements are already being reviewed by the Department of Justice. The alternative bases for review cited by some commenters lack merit, and there is no legitimate rationale for requiring submission of the agreements in unredacted format.

I. THE LICENSE ASSIGNMENTS WILL SERVE THE PUBLIC INTEREST.

As the Applications demonstrate, these license assignments will yield substantial and verifiable public interest benefits. They align with the objectives of the Administration, the Commission’s secondary market policy, and its National Broadband Plan by shifting spectrum that is not currently being used to a provider that will use that spectrum to benefit consumers. Specifically, these transactions will enable Verizon Wireless to address the growing mobile broadband demands of its customers. These demands have continued to increase since the parties announced these transactions in December, and no party has provided data to dispute them or the resulting need to deploy more spectrum.

A. Recent Data on Growing Demand for Mobile Broadband Confirm the Need for the Efficient Assignment of Spectrum to Serve Consumers.

Since these license assignments were announced, Chairman Genachowski has reaffirmed the Commission’s cardinal objective of ensuring wireless providers have adequate spectrum to meet consumers’ needs. He recently reiterated “[t]he plain fact” that “aggregate consumer demand for spectrum for broadband is increasing at a very rapid pace.”⁴ He concluded that “[i]f we don’t ... make much more spectrum available for mobile broadband, we are going to get swamped by an ocean of demand and risk our competitive advantage in the race to lead the

⁴ Julius Genachowski, Chairman, Federal Communications Commission, Remarks As Prepared For Delivery, 2012 Consumer Electronics Show at 5 (Jan. 11, 2012) (“Genachowski CES Remarks”), <http://www.fcc.gov/document/chairman-genachowski-2012-consumer-electronics-show>.

world in mobile innovation.”⁵ During this same period, the Commission considered and approved a similar spectrum-only transaction, explaining that “the transition of underutilized ... spectrum towards mobile broadband use ... support[s] our goal of expanding mobile broadband deployment throughout the country.”⁶

It is well documented – and unchallenged by commenters – that skyrocketing demand for wireless broadband services requires carriers to accelerate the addition of network capacity to keep pace with consumer demand.⁷ Government and industry experts concur that the demand for mobile data by 2015 will be 25 to 50 times greater than it was in 2010,⁸ due largely to

⁵ *Id.* at 6. The Chairman has framed this issue in the context of global competitiveness: mobile broadband is “a key pillar of a powerful strategic plan to harness communications technology to drive our economy and enduring job creation.” *Id.* at 9. He also focused on the need to ensure a “strategic bandwidth advantage.” *Id.* The Chairman concluded that “American consumers will face slower speeds, more dropped connections, and higher prices” if the Commission does not make additional spectrum available. *Id.* at 6.

⁶ *AT&T Inc. and Qualcomm Inc.*, Order, FCC 11-188, ¶ 94 (Dec. 22, 2011) (“*AT&T-Qualcomm Order*”).

⁷ *See, e.g.*, Verizon Wireless-SpectrumCo Application, Exh. 1 (“Verizon Wireless-SpectrumCo Public Interest Statement”) at 6-10. In fact, various commenters support Verizon Wireless on this point. *See, e.g.*, Comments of International Brotherhood of Electrical Workers, Local 827 and System Council T-6 (“IBEW”) at 3; Comments of Free State Foundation (“Free State Foundation”) at 4; Comments of Latinos in Information Sciences and Technology Association (“LISTA”) at 2.

⁸ Verizon Wireless-SpectrumCo Public Interest Statement at 7; *see also* FEDERAL COMMUNICATIONS COMMISSION, MOBILE BROADBAND: THE BENEFITS OF ADDITIONAL SPECTRUM 5 (Oct. 2010) (“MOBILE BROADBAND TECHNICAL PAPER”) (“mobile data demand is expected to grow between 25 and 50 times current levels within 5 years”), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-302324A1.pdf; CISCO, CISCO VISUAL NETWORKING INDEX: GLOBAL MOBILE DATA TRAFFIC FORECAST UPDATE, 2010-2015 at 2 (Feb. 1, 2011) (“CISCO 2010-2015 FORECAST”) (estimating that global mobile traffic will increase 26-fold between 2010 and 2015), http://newsroom.cisco.com/ekits/Cisco_VNI_Global_Mobile_Data_Traffic_Forecast_2010_2015.pdf. Cisco’s latest projection for global mobile traffic in 2015 is higher even than last year’s projection, up from 76 exabytes to over 82 exabytes annually, and it projects continued substantial growth in 2016 as the global mobile traffic is estimated to increase to 130 exabytes, compared to only 16 exabytes this year. *Compare id.* at 5 with CISCO, CISCO VISUAL NETWORKING INDEX: GLOBAL MOBILE DATA TRAFFIC FORECAST UPDATE, 2011-2016 at 5 (Feb. 14, 2012) (“CISCO 2011-2016 FORECAST”),

consumers' adoption of advanced devices that use exponentially more bandwidth than traditional mobile phones.⁹ The most recent statistics on increased smartphone usage and adoption further highlight the strain carriers face in assuring robust network capacity. Cisco reported that last year the typical smartphone generated 35 times the traffic of a traditional mobile phone, up from only 24 times in 2010,¹⁰ and 4G connections generate 28 times more traffic than non-4G connections.¹¹ Smartphone adoption is accelerating rapidly: recent surveys show that among consumers 25 to 34, eight out of ten recent new phone purchases were smartphones.¹²

Further exacerbating the network capacity challenge is the rapid adoption of tablets, which use approximately 120 times the capacity of traditional mobile phones.¹³ The first mobile-connected tablet had not even been released when the Commission staff issued the National Broadband Plan in March 2010,¹⁴ identifying the pressing need for additional spectrum, even in a pre-tablet, pre-4G mobile broadband marketplace.¹⁵ According to one recent study,

http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.html.

⁹ See Julius Genachowski, Chairman, Federal Communications Commission, Remarks As Prepared For Delivery, CTIA Wireless 2011 at 5 (Mar. 22, 2011) (“Genachowski CTIA Remarks”), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-305309A1.pdf.

¹⁰ Compare CISCO 2010-2015 FORECAST at 2 with CISCO 2011-2016 FORECAST at 2.

¹¹ CISCO 2011-2016 FORECAST at 2.

¹² See *Survey: New U.S. Smartphone Growth by Age and Income*, NIELSENWIRE, Feb. 20, 2012, http://blog.nielsen.com/nielsenwire/online_mobile/survey-new-u-s-smartphone-growth-by-age-and-income/.

¹³ Verizon Wireless-SpectrumCo Public Interest Statement at 9; Genachowski CTIA Remarks at 5; CISCO 2011-2016 FORECAST at 2.

¹⁴ FCC, CONNECTING AMERICA: THE NATIONAL BROADBAND PLAN (Mar. 16, 2010) (“National Broadband Plan”), <http://www.broadband.gov/plan>.

¹⁵ Apple began selling the 3G-capable iPad on April 30, 2010. See Press Release, Apple, iPad Wi-Fi + 3G Models Available in US on April 30 (Apr. 20, 2010), <http://www.apple.com/pr/library/2010/04/20iPad-Wi-Fi-3G-Models-Available-in-US-on-April-30.html>.

tablet network traffic increased more than 200 percent on the day after Christmas 2011.¹⁶ By 2016, it is projected that mobile-connected tablets alone will generate almost as much traffic as the entire global mobile network in 2012.¹⁷ These new capabilities are encouraging ongoing innovation in the communications marketplace, from mobile applications and devices to services that help address societal needs, such as e-learning, m-health monitoring services or downloading and remote analysis of 3D MRI scans, and energy conservation.

B. The License Assignments Are Precisely the Use of the Secondary Market that the Commission Has Said Will Help Meet Mobile Broadband Demand and Achieve the Objectives of the National Broadband Plan.

The Applicants have demonstrated that these assignments further the Commission’s goals for the secondary spectrum market – to “permit spectrum to flow more freely among users and uses in response to economic demand”¹⁸ and to facilitate “the availability of unused and underutilized spectrum to those who would use it for providing service.”¹⁹ No commenter challenges that goal or explains why the assignments would conflict with existing Commission policy.²⁰ To the contrary, Applicants and commenters have shown that the transactions would support those goals by moving spectrum not being used to serve consumers to an existing

¹⁶ Press Release, Jumptap, Holiday Tablet Traffic Jumps 229% (Feb. 2, 2012), <http://www.jumptap.com/holiday-tablet-traffic-jumps-229/>.

¹⁷ CISCO 2011-2016 FORECAST at 3.

¹⁸ *Fostering Innovation and Investment in the Wireless Communications Market; A National Broadband Plan for Our Future*, Notice of Inquiry, 24 FCC Rcd 11322, 11331 n.27 (2009); *see also Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets*, Second Report and Order, Order on Reconsideration, and Second Further Notice of Proposed Rulemaking, 19 FCC Rcd 17503, 17505 ¶ 1 (2004); Verizon Wireless-SpectrumCo Public Interest Statement at 16-19.

¹⁹ *Principles for Promoting the Efficient Use of Spectrum by Encouraging the Development of Secondary Markets*, Policy Statement, 15 FCC Rcd 24178, 24185-86 ¶ 18 (2000).

²⁰ Efforts by two commenters to recast and modify the Commission’s policy objectives are irrelevant to this license assignment proceeding. *See* Petition to Deny of Public Knowledge *et al.* (“Public Knowledge”) at 33-34; Petition to Deny of Free Press (“Free Press”) at 34.

provider with demonstrated demand.²¹ That change, in turn, will allow Verizon Wireless to better serve all of its customers, including those consumers who rely more heavily on mobile broadband as their primary broadband connection.²²

The Commission’s recent announcements and actions underscore why these transactions fully align with its goals. In January, Chairman Genachowski cited secondary market transactions as one of the key measures necessary “[t]o meet th[e] demand” for more spectrum dedicated to mobile broadband use.²³ And in its December order approving AT&T’s acquisition of nationwide spectrum from Qualcomm, the Commission expressed support for the assignment of “underutilized” spectrum, emphasizing that “to compete effectively and innovate, a wireless provider must have access to adequate spectrum.”²⁴

Spectrum acquisition is not merely the province of the largest carriers. A review of the several hundred assignments and transfers approved from January 2010 through December 2011 reveals that almost eight of every ten secondary market transactions resulted in spectrum being

²¹ Free State Foundation at 8; Comments of the Technology Policy Institute (“Technology Policy Institute”) at 3.

²² See AARON SMITH, 35% OF AMERICAN ADULTS OWN A SMARTPHONE, ONE QUARTER OF SMARTPHONE OWNERS USE THEIR PHONE FOR MOST OF THEIR ONLINE BROWSING, PEW RESEARCH CENTER, July 11, 2011, http://pewinternet.org/~media/Files/Reports/2011/PIP_Smartphones.pdf (finding that 38 percent of minority smartphone owners use their cell phone for most online usage, compared to 25 percent nationally); Don Kellogg, *Among Mobile Phone Users, Hispanics, Asians are Most-Likely Smartphone Owners in the U.S.*, NIELSENWIRE, Feb. 1, 2011, <http://blog.nielsen.com/nielsenwire/consumer/among-mobile-phone-users-hispanics-asians-are-most-likely-smartphone-owners-in-the-u-s/> (finding that “smartphone penetration is even higher among mobile users who are part of ethnic and racial minorities in the U.S.”).

²³ Genachowski CES Remarks at 5.

²⁴ *AT&T-Qualcomm Order* at ¶¶ 30, 95.

acquired by carriers other than AT&T, Sprint Nextel, T-Mobile, or Verizon Wireless.²⁵ Contrary to the claims of some,²⁶ this underscores that the secondary market provides all carriers with the opportunity to access additional spectrum to meet their customers' demands and their networks' capacity challenges.

Moreover, Verizon Wireless actively participates in the secondary market as a seller as well as a buyer, contrary to unsubstantiated claims that it is warehousing spectrum.²⁷ In the past five years, Verizon Wireless has transferred nearly 40 licenses to carriers of all sizes as it worked to rationalize its spectrum holdings, and it has numerous additional pending transactions before the Commission.²⁸ These transfers included licenses for spectrum below 1 GHz, despite the unsubstantiated claims of some commenters that such spectrum is the most valuable for mobile broadband services.²⁹ Additionally, through its LTE in Rural America Program, Verizon Wireless provides interested rural providers with the opportunity to lease 700 MHz spectrum to build out the network and share LTE services. Thus far, 15 rural carrier partners are leasing spectrum from Verizon Wireless, covering 2.7 million people in rural communities in 11 states,³⁰ and Verizon Wireless is in active negotiations with several additional carriers to extend the program.

²⁵ These figures are based on data from the FCC's Assignments and Transfers data table dated February 26, 2012 that encompassed non-pro forma applications with a consummated status, where the consummation occurred between January 1, 2010 and December 31, 2011.

²⁶ See, e.g., Petition to Condition or Otherwise Deny of RCA – The Competitive Carriers Association ("RCA") at 24; Petition to Deny of NTCH, Inc. ("NTCH") at 2-3.

²⁷ See Free Press at 33; RCA at 2.

²⁸ See Verizon Wireless Spectrum Assignments to Other Licensees, 2007 – Present, attached as *Exhibit 1* at 1-2.

²⁹ See, e.g., Free Press at 13-14; Public Knowledge at 47.

³⁰ See, e.g., Press Release, Verizon Wireless, Pioneer Cellular's 4G LTE Network Testing Signals All Systems Go (Dec. 16, 2011), <http://news.verizonwireless.com/news/2011/12/pr2011-12-16.html>.

The need for a vibrant secondary market – and transactions like the two at issue here – is underscored by the lack of new spectrum available at auction in the near term.³¹ Even with the recent enactment of spectrum legislation, it will likely be years before additional spectrum is allocated, service rules are adopted, clearing processes for incumbents are set, and auctions are held.³²

In addition, the Applicants have demonstrated that these transactions also further the goals of the Administration³³ and the National Broadband Plan³⁴ – a showing no commenter can rebut. The critical need for additional spectrum for mobile broadband usage was central to President Obama’s Presidential Memorandum on wireless broadband, which extolled the promise of mobile broadband but concluded that “[t]his new era in global technology leadership will only happen if there is adequate spectrum available to support the forthcoming myriad of wireless devices, networks, and applications that can drive the new economy.”³⁵

The National Broadband Plan also recognized that, in addition to new mobile allocations, optimizing spectrum use through secondary markets and other means will help to meet the “growing demand for wireless broadband services and to ensure that America keeps pace with

³¹ While the SpectrumCo and Cox Wireless AWS licenses will help meet the growth in Verizon Wireless customers’ demand for wireless broadband, Verizon Wireless fully expects that it will need additional spectrum in the future. Declaration of William H. Stone, Executive Director of Network Strategy for Verizon (“Supplemental Stone Declaration”), attached as *Exhibit 2* at ¶ 3.

³² Comments of Information Technology and Innovation Foundation (“ITIF”) at 2-3; Petition to Deny of T-Mobile USA, Inc. (“T-Mobile”) at 14-15; Comments of Sprint Nextel Corporation (“Sprint Nextel”) at 16.

³³ President Barack Obama, *Presidential Memorandum: Unleashing the Wireless Broadband Revolution* (June 28, 2010) (“June 2010 Presidential Memorandum”), <http://www.whitehouse.gov/the-press-office/presidential-memorandum-unleashing-wireless-broadband-revolution>.

³⁴ National Broadband Plan at 76-77; *see also* Comments of Hispanic Technology & Telecommunications Partnership (“HTTP”) at 2.

³⁵ June 2010 Presidential Memorandum.

the global wireless revolution.”³⁶ The National Broadband Plan recommended that the Commission “promote access to unused and underutilized spectrum” and “permit a variety of secondary market transactions.”³⁷ It concluded that failing to address the spectrum crunch “could mean higher prices, poor service quality, an inability for the U.S. to compete internationally, depressed demand, and ultimately a drag on innovation.”³⁸

The Applications provide the Commission with a clear opportunity to help advance these objectives, as did the recently approved AT&T-Qualcomm transaction. In that transaction, the Commission found that “the promised ability of customers to download data more quickly ... appears to sit squarely within the objectives of the National Broadband Plan.”³⁹ The same principles apply here.

C. Verizon Wireless Needs Spectrum to Provide the Necessary Capacity to Continue to Deliver the Service Its Customers Expect.

The Applications provide extensive information and data demonstrating why Verizon Wireless will not be able to fully meet consumers’ growing demand for mobile broadband with its current spectrum holdings. No commenter rebuts this showing. In a Supplemental Declaration, attached as *Exhibit 2*, Bill Stone, Verizon’s Executive Director of Network Strategy, provides further data illustrating how, despite network efficiencies and further investment, skyrocketing demand will overtake the company’s 4G LTE capacity absent additional spectrum resources.⁴⁰ These license assignments will allow Verizon Wireless to supplement the spectrum

³⁶ National Broadband Plan at 84-85.

³⁷ *Id.* at 83.

³⁸ *Id.* at 77.

³⁹ *AT&T-Qualcomm Order* at ¶ 88.

⁴⁰ *See generally* Supplemental Stone Declaration. In *Exhibit 3*, wireless engineering expert Dr. David Borth attests to the soundness of the methodology that serves as the basis for the Stone Supplemental Declaration’s conclusions regarding the data demands placed on, and the capacity

currently used to provide 4G LTE service and alleviate spectrum constraints that otherwise will degrade service – in some areas as early as 2013 and in many others by 2015.

Verizon Wireless launched its 4G LTE network in December 2010 on its Upper 700 MHz C Block licenses,⁴¹ and it will soon begin deploying its existing AWS spectrum holdings into the 4G LTE network as well. The LTE network now covers over 200 million people in 195 markets.⁴² The company originally planned to extend LTE coverage to its existing nationwide 3G footprint – coverage to 294 million people, or 95 percent of the U.S. population, and over 2,000 rural counties – by year-end 2013,⁴³ but it recently announced plans to achieve that coverage by mid-year 2013, roughly 15 months from now.⁴⁴

Increasing Demand for Network Capacity. Mr. Stone’s Supplemental Declaration applies year-end 2011 statistics to update the trends driving massive and accelerating growth in wireless data demand on Verizon Wireless’ network. That increase in network traffic is driven

constraints of, the Verizon Wireless Network. See Declaration of David E. Borth (“Borth Declaration”), attached as *Exhibit 3*.

⁴¹ See Press Release, Verizon Wireless, Blazingly Fast: Verizon Wireless Launches The World’s Largest 4G LTE Wireless Network On Sunday, Dec. 5 (Dec. 4, 2010), <http://news.verizonwireless.com/news/2010/12/pr2010-12-03.html>.

⁴² Press Release, Verizon Wireless, Verizon Continues To Grow Its 4G LTE Network, Launching Service in Five New Markets And Expanding In Three Others On Jan. 19 (Jan. 18, 2012), <http://news.verizonwireless.com/news/2012/01/pr2012-01-17i.html>.

⁴³ Press Release, Verizon Wireless, Verizon Wireless Launches The World’s Largest 4G LTE Wireless Network On Dec. 5 (Dec. 1, 2010), <http://news.verizonwireless.com/news/2010/12/pr2010-11-30a.html>.

⁴⁴ Thomson Reuters Streetevents, Edited Transcript, VZ – Q4 2011 Verizon Earnings Conference Call, at 3 (Jan. 24, 2012), http://www22.verizon.com/idc/groups/public/documents/adacct/4q11_vz_transcript.pdf.

by the growing number of connections using Verizon Wireless' network, the shift toward more broadband-capable devices, and the rise of bandwidth-intensive applications and services.⁴⁵

The graph below shows both historical and projected data on Verizon Wireless' network, and illustrates the extraordinary growth in customers' use of data services.⁴⁶ Starting from zero in early December 2010, LTE data traffic (the blue curve) sharply increased in just the first year of availability, and growth is projected to **[BEGIN HIGHLY CONFIDENTIAL]**

⁴⁵ Beyond the 4G LTE network deployment and service rollout, Verizon Wireless is committed to seeding the 4G LTE ecosystem. The company's LTE Innovation Center in Waltham, Massachusetts and its Application Innovation Center in San Francisco are proving to be enormously productive aids to the development and commercialization of 4G LTE products, services, and applications. Press Release, Verizon Wireless, Verizon Innovation Center Participants Highlight Work Of The LTE Ecosystem On Opening Day (July 12, 2011), <http://news.verizonwireless.com/news/2011/07/pr2011-07-11d.html>; Press Release, Verizon Wireless, Verizon Opens Application Innovation Center in San Francisco (Aug. 10, 2011), <http://news.verizonwireless.com/news/2011/08/pr2011-08-09a.html>.

⁴⁶ **[BEGIN HIGHLY CONFIDENTIAL]**

[END HIGHLY CONFIDENTIAL]

[END HIGHLY CONFIDENTIAL]

Verizon Wireless has experienced actual data growth rates that exceed the company's projections.⁴⁷ For example, actual fourth quarter 2011 data traffic was double Verizon Wireless' 2009 forecast for that quarter. And Verizon Wireless has now revised the fourth quarter 2015 forecast upward by approximately 700 percent. Given this historical pattern, spectrum capacity constraints may occur even sooner than projected here.

Verizon Wireless needs to ensure that it has sufficient spectrum resources to meet the growing needs of nearly 109 million connections. As wireless data usage expands, speed also becomes an increasingly important end-user consideration and a differentiator among wireless competitors, as is reflected in the frequent advertising touting mobile providers' network speeds. Higher speeds are critical for applications that require high responsiveness, like two-way video

⁴⁷ See Verizon Wireless-SpectrumCo Application, Exh. 3, Declaration of William H. Stone, Executive Director of Network Strategy for Verizon ("Initial Stone Declaration") at ¶¶ 10-11.

communications. Conversely, degraded speeds have a significant negative impact on the user experience and productivity, particularly for bandwidth-intensive applications and services. Verizon Wireless thus engineers its 4G LTE network to provide customers not only with quick and reliable connections, but with access to speeds that users will grow to expect as the norm – for LTE, typical download speeds of 5–12 Mbps and upload speeds of 2–5 Mbps. Speed and spectrum capacity are directly related, however, and high-speed services demand substantial bandwidth.

Determining Where Additional Spectrum is Needed. Because substantial lead time is required to acquire and plan for the use of spectrum,⁴⁸ Verizon Wireless, like other carriers, constantly assesses whether it has sufficient spectrum in specific markets to meet the needs of its customers. As the Stone Declarations describe, Verizon Wireless applies a demand forecast model based on traffic data collected on the 4G LTE network.⁴⁹ The model is informed by the trends above and factors such as average user throughput, historical device sales data, projections of future device sales, customer data usage, and usage trends for new mobile applications.

Mr. Stone explains how these trends help determine the amount of data traffic that cell site sectors can handle, given current spectrum holdings, while maintaining the 4G LTE network performance that Verizon Wireless requires for its customers. Verizon Wireless' experience with LTE over the past year has demonstrated that a fully loaded LTE cell site sector using the Upper 700 MHz C Block spectrum can support [BEGIN HIGHLY CONFIDENTIAL]

[END HIGHLY CONFIDENTIAL] and still maintain the speeds the company seeks to provide and its customers expect.⁵⁰

⁴⁸ *Id.* at ¶¶ 12-13.

⁴⁹ *See id.* at ¶¶ 19-22; Supplemental Stone Declaration at ¶¶ 18-20.

⁵⁰ Supplemental Stone Declaration at ¶ 21.

The Verizon Wireless LTE network capacity assessment accounts for additional capacity that technology advancements and network enhancements can achieve in the network. Specifically, while the data traffic threshold for spectrum-constrained sectors using the Upper 700 MHz C Block spectrum is [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL], the company expects the threshold to be higher by year-end 2015 due to its plans to aggressively deploy capacity-enhancing techniques. One promising technique is the use of LTE small cells. Small cells typically have a maximum coverage area of up to several hundred meters and effectively increase the overall capacity of the macrocell coverage area in which they operate. Verizon Wireless will begin implementing LTE small cells [BEGIN HIGHLY CONFIDENTIAL]

[END HIGHLY CONFIDENTIAL]. Another potential capacity-enhancing technique is adoption of the LTE Advanced standard that Verizon Wireless will be deploying throughout its network.

However, these network infrastructure investments will not be adequate to keep pace with the projected mobile data demand in years 2013 to 2015 and beyond. Indeed, even in markets where Verizon Wireless holds 20 MHz of AWS spectrum already – spectrum it plans to deploy in the LTE network [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] – it will need more spectrum to meet demand.⁵¹ Given the projected [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] in data traffic year over year, even the most optimistic assumptions involving the deployment of widespread small cells and other techniques would not provide sufficient capacity by the end of that two-year period.

⁵¹ *Id.* at ¶ 29.

As traffic increases above the capacity threshold per cell sector, some customers will experience decreases in speed and quality depending on the mix of uses occurring at that point. Most affected will be services like video streaming and real-time two-way video conferencing. A customer who is streaming video or downloading a large file, for example, is more likely to notice increased jitter or longer buffering times, while a customer on a static web site may not notice a slower speed. Virtually all customers in sectors where demand significantly exceeds the cell sector threshold will experience noticeable reductions in speed, even customers not using speed-intensive services. As latency or packet congestion continues to build in the network, requests for retransmission of data or reinitiation of data sessions by various applications in the device may take place, further degrading the customer experience.

Examples of Markets Where More Spectrum Is Needed in Near-Term. The Supplemental Stone Declaration applies the spectrum planning methodology to 18 markets of varying size to demonstrate rising spectrum constraints across the Verizon Wireless network.⁵² The maps in *Exhibit 2* depict all LTE cell sites operating in these markets as of YE 2011 and, as Mr. Stone concludes, “[i]n each case, our projections show that existing spectrum will not meet demand by the end of 2015 across these markets, and in most markets, by as soon as the end of 2013.”⁵³

The maps for [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] are reprinted below for illustration. They show actual capacity demand at each cell site at YE 2011, and projected demand at YE 2013 and YE 2015. Most cell sites shown are comprised of three sectors. Each sector is color-coded to show whether capacity is projected to be sufficient for projected data traffic. The color scheme for the maps is as follows.

⁵² *Id.* at ¶ 30.

⁵³ *Id.*

A sector in green means customers are experiencing LTE service as Verizon Wireless intends. A sector that is colored yellow is projected to exceed [BEGIN HIGHLY CONFIDENTIAL]

[END HIGHLY CONFIDENTIAL] during busy hours, meaning that some customers served by this sector will experience decreases in speeds, depending on the data services they are accessing. In sectors marked red, many more customers are likely to experience a more widespread and substantial degradation in speed and quality of some of their data services. By the end of 2015, the number of red sectors indicating substantial spectrum constraints increases, sometimes sharply, in each market. If the increase in capacity due to other network infrastructure investments does not occur as anticipated, many more cells could also be spectrum constrained by that time.

As the map for YE11 demand in [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] shows, no sector downloaded more than [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] during the applicable busy hour, indicating customer experience within acceptable ranges.⁵⁴

⁵⁴ *Id.* at ¶ 32.

[BEGIN HIGHLY CONFIDENTIAL]

[END HIGHLY CONFIDENTIAL]

By the end of 2013, however, many of **[BEGIN HIGHLY CONFIDENTIAL]** **[END HIGHLY CONFIDENTIAL]** cell site sectors are projected to become spectrum constrained – even with infrastructure enhancements and technology improvements.⁵⁵ The red sectors are of greatest concern because they are substantially above Verizon Wireless’ design criteria for 2013. Thus, many customers served by these sectors are likely to experience slower speeds during many hours each day. Further, the map shows that the negative impacts on customers due to the lack of spectrum will typically appear first in high-usage areas like the downtown business core.

⁵⁵ *Id.* at ¶ 33.

[BEGIN HIGHLY CONFIDENTIAL]

[END HIGHLY CONFIDENTIAL]

By the end of 2015, growth in data traffic is projected to create a spectrum capacity shortfall that extends well beyond the more densely populated urban core.⁵⁶ Nearly all sites have sectors colored red, meaning that, absent deployment of additional spectrum, customers in **[BEGIN HIGHLY CONFIDENTIAL]** **[END HIGHLY CONFIDENTIAL]** would experience major impacts to speed and quality of their service.

⁵⁶ *Id.*

[BEGIN HIGHLY CONFIDENTIAL]

[END HIGHLY CONFIDENTIAL]

The same capacity constraints also exist in markets in which Verizon Wireless has access to AWS F Block spectrum that it purchased at auction,⁵⁷ such as **[BEGIN HIGHLY**

CONFIDENTIAL] **[END HIGHLY CONFIDENTIAL]** This AWS

spectrum, which will be deployed **[BEGIN HIGHLY CONFIDENTIAL]**

[END HIGHLY CONFIDENTIAL], will effectively double the ability of cell sites to handle data traffic, meaning that the point at which traffic demand will begin imposing speed and quality limitations will be **[BEGIN HIGHLY CONFIDENTIAL]** **[END**

⁵⁷ *Id.* at ¶ 35.

HIGHLY CONFIDENTIAL]. Even with the additional capacity provided by currently held AWS spectrum in combination with the 700 MHz spectrum, however, Mr. Stone’s projections for such markets show that consumers’ needs will outstrip capacity.⁵⁸ The maps for **[BEGIN HIGHLY CONFIDENTIAL]** **[END HIGHLY CONFIDENTIAL]**, and other such markets demonstrate that projected growth in data traffic will exhaust all spectrum available in these markets as well.

These spectrum constraints are not confined to large cities but extend to smaller markets as well,⁵⁹ as shown by the maps from **[BEGIN HIGHLY CONFIDENTIAL]**

[END HIGHLY CONFIDENTIAL]. The network may also experience constraints in rural and other less densely populated areas despite serving fewer overall customers. The company also plans to introduce new products that are expected to further increase data traffic in rural areas. Data usage on these products is expected to be significantly greater than that of a smartphone, for example, **[BEGIN HIGHLY CONFIDENTIAL]**

[END HIGHLY CONFIDENTIAL]. In many cases, just one customer using increased amounts of capacity can have significant impact on a rural cell site.

D. Verizon Wireless’ Industry-Leading Spectral Efficiency Disproves Allegations of Warehousing and Belies Claims that Engineering Solutions Alone Can Solve Its Capacity Constraints.

No commenter supplies technical data or other information that even attempts to demonstrate why Verizon Wireless does not need the spectrum covered by these transactions. The bald and unsupported assertions that the company is “warehousing” spectrum or otherwise

⁵⁸ *Id.*

⁵⁹ *Id.* at ¶¶ 36-38.

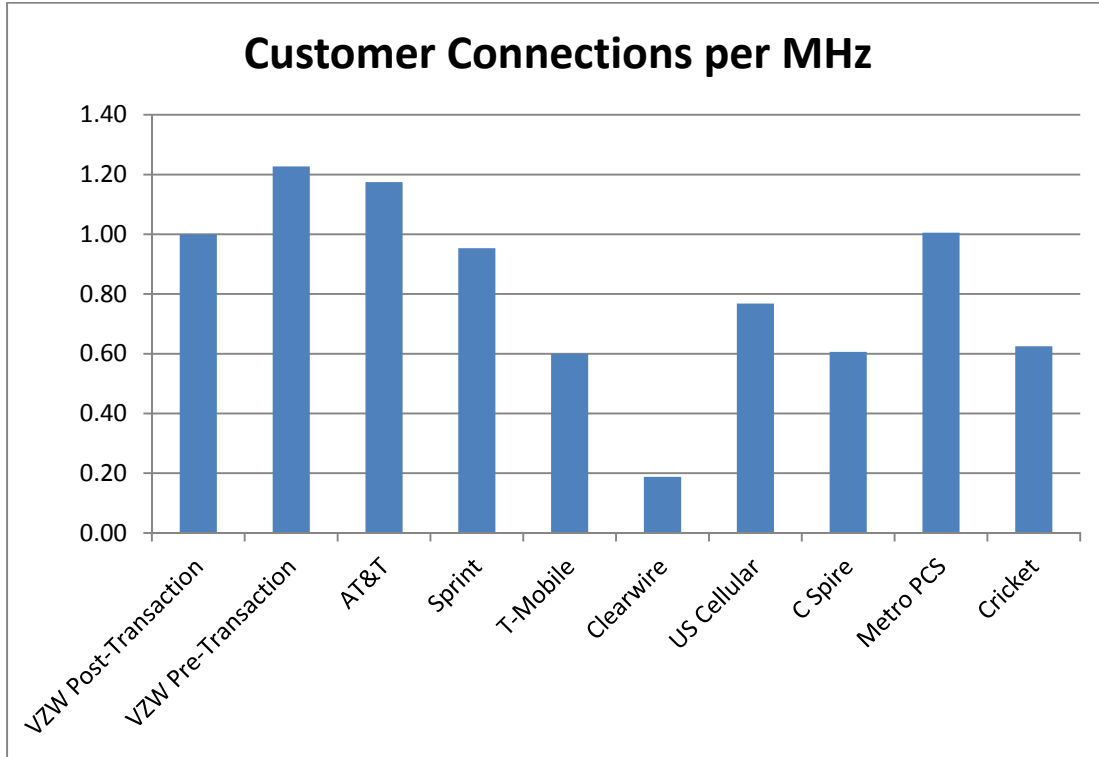
not fully utilizing its spectrum resources lack any substance and, in any event, are fully rebutted by Mr. Stone's declarations, as well as by the company's spectral efficiency compared to other providers. The Commission should accordingly quickly dismiss these comments.

Verizon Wireless Is an Industry Leader in Spectral Efficiency. Verizon Wireless is today, and post-transaction will continue to be, one of the most efficient users of spectrum. Verizon Wireless currently serves its industry-leading 109 million wireless customer connections using an average of 89 MHz nationwide,⁶⁰ with each megahertz of spectrum serving on average 1.23 million customer connections. Post-transaction, these wireless connections would be served using an average of 109 MHz nationwide, with each megahertz of spectrum serving on average almost one million customer connections. Despite the claims of T-Mobile and others to the contrary,⁶¹ this usage makes Verizon Wireless the most spectrally efficient wireless provider currently, and the second most spectrally efficient provider post-transaction (second only to AT&T and tied with MetroPCS).

⁶⁰ The Applications stated that Verizon Wireless has a national average spectrum depth of 88 MHz. Verizon Wireless-SpectrumCo Public Interest Statement at 15; Verizon Wireless-Cox Public Interest Statement at 14; Initial Stone Declaration at ¶ 14. This figure was rounded down from 88.44 MHz, which was accurate as of a date in the third quarter of 2011. Since these documents were submitted to the Commission, certain small spectrum acquisitions by Verizon Wireless were consummated, raising Verizon Wireless' national spectrum depth average to 88.57 MHz, which is appropriately rounded up to 89 MHz. This small change does not impact the calculation of how many customer connections Verizon Wireless serves per MHz.

⁶¹ See, e.g., T-Mobile at 4-5.

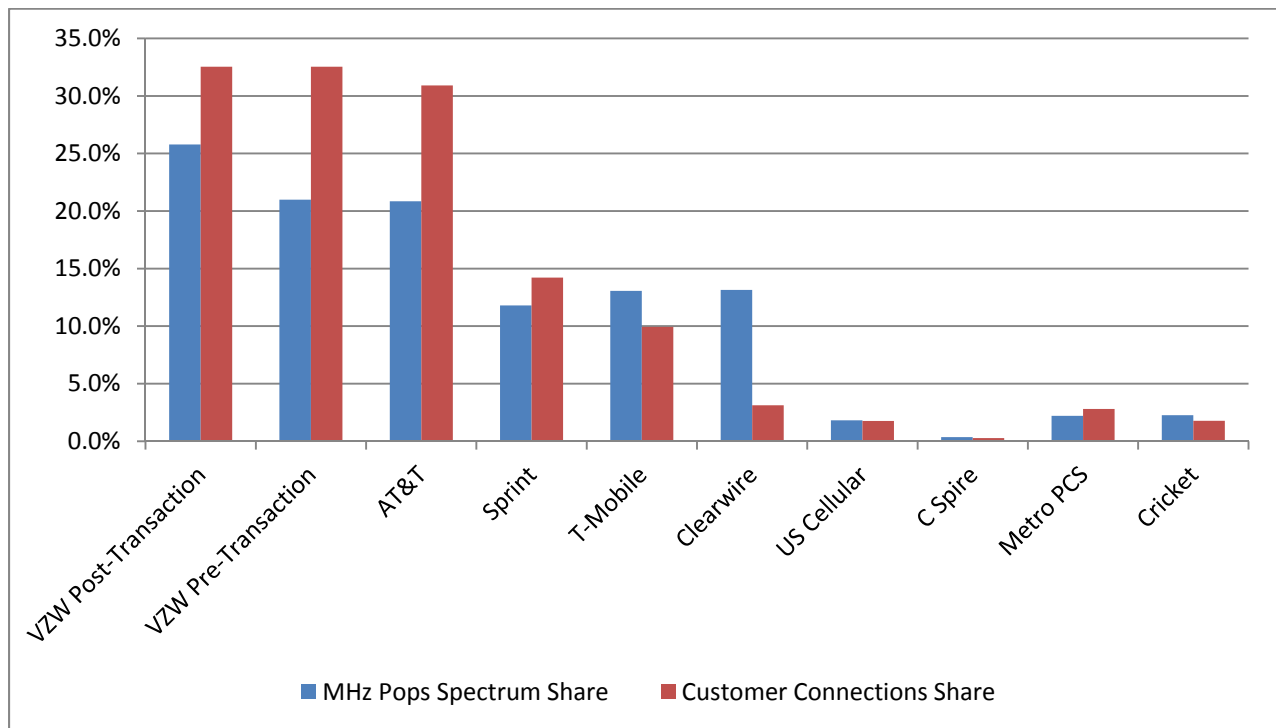
Customer Connections per 1 MHz (in Millions)⁶²



⁶² Customer connections numbers are based on each company’s 4th Quarter 2011 results. In the “Customer Connections per 1 MHz” chart (as with the “Spectrum Share v. Customer Connections Share” chart that follows), Sprint and Clearwire are treated individually even though they share spectrum and Clearwire’s spectrum is attributable to Sprint. *See Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services*, Fifteenth Report, 26 FCC Rcd 9664, 9682 n.19 (2011) (“Fifteenth Report”) (“Throughout this Report, we attribute Clearwire to Sprint Nextel when discussing spectrum holdings and network coverage.”). If Sprint and Clearwire are treated as a single entity, their customer connections per 1 MHz would be 550,000. Because the chart reflects connections per MHz of spectrum holdings, Sprint’s customer connection numbers do not include an estimated 7.2 million customers that use Clearwire’s spectrum and network. Instead, these customers are included in Clearwire’s customer connection numbers, just as Verizon Wireless mobile virtual network operator (“MVNO”) customer connections are included in the Verizon Wireless total. C Spire’s customer connections are based on an analyst report’s estimate because C Spire does not publicly release customer numbers. Finally, the spectrum calculations use the average MHz per licensed POP of bands included in the spectrum screen (*i.e.*, cellular, PCS, AWS, 700 MHz, 55.5 MHz of BRS/EBS, and SMR/900 MHz). These spectrum calculations (except VZW Pre-Transaction) also presume all known material and pending transactions are closed, including the proposed Verizon Wireless-Leap and T-Mobile-AT&T transactions.

Verizon Wireless’ spectral efficiency is similarly evident when its share of MHz*POPs⁶³ is compared to its share of customer connections. As demonstrated below, Verizon Wireless’ spectrum share is 21 percent, while its customer market share is approximately 33 percent – a ratio of 0.65 – the most efficient ratio among the wireless providers identified below. Post-transaction, Verizon Wireless’ spectrum share will increase to nearly 26 percent. When applied to its 33 percent customer market share, this results in a ratio of 0.79 – the second most efficient ratio among the wireless providers identified below (again tied with MetroPCS).

Spectrum Share v. Customer Connections Share⁶⁴



None of these calculations takes into account spectrum that is usable for mobile voice and broadband services but is not currently included in the spectrum screen. For example, Clearwire provides fixed and mobile broadband services using approximately 160 MHz of BRS and EBS

⁶³ This metric allows the aggregation of spectrum holdings across different areas by multiplying the megahertz of spectrum held in an area by the population in that area.

⁶⁴ See *supra* note 62.

spectrum in most markets (although the screen only accounts for 55.5 MHz of BRS spectrum and no EBS spectrum).⁶⁵ If this spectrum, for example, were included in the above calculations, Verizon Wireless’ national spectrum share would be even lower, and its efficiency in terms of MHz of spectrum per customer would be even higher.

This evidence proves Verizon Wireless is putting its spectrum to use efficiently and effectively and will continue to do so. By comparison, while T-Mobile claims to have implemented techniques to “mak[e] very efficient use of its spectrum,”⁶⁶ the facts show that it is using each 1 megahertz of spectrum to serve on average only 600,000 customers (as compared with Verizon Wireless service to 1.23 million customers per megahertz). Despite T-Mobile’s fixation with Verizon Wireless’ spectrum below 1 GHz,⁶⁷ in fact spectrum above 1 GHz (like T-Mobile’s) offers wireless providers greater capacity than spectrum below 1 GHz.⁶⁸ Thus, Verizon Wireless is using its spectrum (on a per megahertz basis) to serve significantly more customers than T-Mobile even though T-Mobile’s spectrum is capable of greater capacity. This evidence also belies any claim that Verizon Wireless is warehousing spectrum.⁶⁹

Requiring Verizon Wireless to uniquely demonstrate its need for additional spectrum would also undermine the Commission’s flexible use and secondary market policies, which

⁶⁵ See *infra* note 181.

⁶⁶ T-Mobile at 5.

⁶⁷ *Id.* at 11-13.

⁶⁸ See *infra* notes 193-196 and accompanying text.

⁶⁹ Compare NTCH at 5; Free Press at 31-36; T-Mobile at 14; Petition to Deny of the Rural Telecommunications Group, Inc. (“RTG”) at 11, 20 with Declaration of Michael L. Katz (“Katz Declaration”), attached as *Exhibit 4* at ¶¶ 34-37. Dr. Katz also rebuts the findings of Professor Judith Chevalier, demonstrating that her model is based on unrealistic assumptions. Katz Declaration at ¶¶ 38-55.

afford licensees the flexibility and latitude to make their own choices⁷⁰ and to assess when and under what conditions they need additional spectrum to best meet the needs of their customers.⁷¹ Moreover, the Commission previously has found that need-based spectrum showings are not necessary to address warehousing concerns when buildout requirements apply to the licenses at issue.⁷² Here, Verizon Wireless intends to comply with the substantial service requirement associated with the AWS licenses and is not seeking any extension or waiver of this performance metric.⁷³ Accordingly, the Commission should decline to impose any need-based spectrum showings on Verizon Wireless in the context of these transactions.⁷⁴

⁷⁰ *Promoting More Efficient Use of Spectrum Through Dynamic Spectrum Use Technologies*, Notice of Inquiry, 25 FCC Rcd 16632, 16644 ¶ 36 (2010) (“In adopting flexible use licensing authorizations for commercial spectrum – including policies and rules that facilitate the development of secondary markets – the Commission has sought to remove regulatory barriers and thereby permit more efficient use of licensed spectrum.... Under these policies, licensees and spectrum lessees already have wide latitude to adopt and implement spectrum management techniques to manage access to and use of their spectrum”).

⁷¹ *Fifteenth Report*, 26 FCC Rcd at 9828 ¶ 282 (“The Commission’s secondary market policies allow existing licensees to obtain additional spectrum capacity and expand their coverage areas to better meet the needs of their customers”).

⁷² The Commission, in eliminating certain requirements to ensure efficient spectrum use by CMRS licensees, concluded that “a strong regulatory emphasis on construction timetables and coverage requirements in lieu of loading requirements” will be “sufficient to protect against spectrum warehousing in CMRS services.” *Implementation of Sections 3(n) and 332 of the Communications Act*, Third Report and Order, 9 FCC Rcd 7988, 8081 ¶ 190 (1994).

⁷³ *See Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands*, Report and Order, 18 FCC Rcd 25162, 25192 ¶ 75 (2003) (“AWS-1 Service Rules Order”). “Substantial service” is defined as “service which is sound, favorable and substantially above a level of mediocre service which just might minimally warrant renewal.” 47 C.F.R. § 27.14(a). To the extent that petitioners believe the AWS performance requirement is insufficient, that issue should be examined in the context of an industry-wide proceeding and not imposed in the context of these transactions as an obligation unique to Verizon Wireless. *See, e.g., General Motors Corp. and Hughes Electronics Corp.*, Memorandum Opinion and Order, 19 FCC Rcd 473, 534 ¶ 131 (2004) (“GM-Hughes Order”) (declining to “single Applicants out for special treatment unwarranted by any likely adverse consequences of the transaction”).

⁷⁴ *See* Petition to Deny of MetroPCS Communications, Inc. (“MetroPCS”) at 3 n.8, 4 (citing Ex Parte Notice from Carl W. Northrop, Counsel for MetroPCS Communications, Inc. to Marlene

Proposed Engineering Solutions Cannot Solve Capacity Needs. Notwithstanding Verizon Wireless’ industry-leading spectral efficiency, some commenters seek to substitute their own ideas for Verizon Wireless’ business judgment as to how to serve its customers most effectively and efficiently.⁷⁵ Many of these parties are not wireless providers and have never built a network, and their claims should be dismissed as lacking basis in experience. In fact, historically Verizon Wireless has used multiple methods to increase spectral efficiency, and it will continue to do so in the LTE network. As noted above, the company intends to deploy LTE small cells extensively once they become available and will undertake other investments to increase LTE capacity. But, as Mr. Stone explains in detail, Verizon Wireless cannot simply engineer its way to sufficient capacity to meet burgeoning demand.⁷⁶ Dr. Borth’s expert opinions reinforce the conclusion that engineering solutions are insufficient to ameliorate Verizon Wireless’ need for additional spectrum to meet demand.⁷⁷

Some parties advocate that Verizon Wireless rely on “cell splitting” in lieu of acquiring new spectrum. Verizon Wireless has always used cell splitting of macro cells and, looking ahead, the company will continue to apply cell splitting as a spot solution when feasible for individual cells that become constrained. But the notion that cell splitting can solve Verizon Wireless’ future capacity constraints, given the massive increase in data demands, particularly in urban areas, is simply not realistic. To obtain the maximum capacity gains from cell splitting, a carrier must be able to locate a new cell in a relatively specific spot or small geographic area. Cell splitting therefore depends on the availability of structures or the ability to construct a

H. Dortch, Secretary, FCC, WT Docket 12-4, at 2 (filed Jan. 27, 2012)); RCA at 19-23; *see also* T-Mobile at 13-15.

⁷⁵ *See* Free Press at 31; Public Knowledge at 32-33.

⁷⁶ Supplemental Stone Declaration at ¶¶ 39-46.

⁷⁷ Borth Declaration at ¶¶ 18-33.

tower. In addition, as Verizon Wireless places more and more sites close together, the benefits of additional sites decline, particularly relative to the zoning, equipment, construction and other steps necessary to deploy them. As many cells within a market become spectrum constrained, it is much more effective to add additional spectrum to serve customer demand.⁷⁸

The alternative suggestion that femto cells can solve capacity constraints is also infeasible.⁷⁹ As noted above, Verizon Wireless intends to deploy an LTE small cell capacity strategy, but femto cells operate at lower power and have much smaller coverage areas (typically on a customer's premises). While femto cells can provide some congestion relief, they will never be able to meet the skyrocketing demand detailed above because they offload only a small fraction of a sector's traffic.⁸⁰

Others propose that Verizon Wireless should refarm its spectrum that is currently being fully used to provide 3G service using EVDO technology.⁸¹ While refarming existing spectrum is an ultimate goal for the company, it would not cede sufficient spectrum in the timeframe necessary to address the constraints identified above. As an initial matter, 3G data usage continues to grow even as customers migrate from 3G to 4G, and the spectrum used for 3G capacity is servicing the growing 3G data demand. While it is possible the company could reclaim individual PCS channels (1.25 MHz) in some markets after the next several years, this will only free up 1.25x1.25 MHz channels on a piecemeal basis. The channels can only support

⁷⁸ See Supplemental Stone Declaration at ¶¶ 43-44; Borth Declaration at ¶ 19.

⁷⁹ See Public Knowledge at 33.

⁸⁰ Supplemental Stone Declaration at ¶ 45; Borth Declaration at ¶ 20. Parties also reference Wi-Fi offloading. *E.g.*, Free Press at 31. Verizon Wireless invests in Wi-Fi networks on a limited basis where spectrum constraints are extremely severe – for instance, in stadiums and concert halls – but generally does not view Wi-Fi offloading as a viable stand-alone solution to congestion. Supplemental Stone Declaration at ¶ 46; Borth Declaration at ¶¶ 21-22.

⁸¹ *E.g.*, Free Press at 31, 33.

peak speeds that are one-eighth of the peak speeds on a 10x10 MHz channel – the company’s current LTE service. As a result, spectrum will simply not be available to support LTE when that capacity is needed – as soon as 2013 – because Verizon Wireless will require, at a minimum, 5x5 MHz channelization for LTE deployment in PCS spectrum.⁸²

E. The Commission Has Repeatedly Found that Assignments of Spectrum Not Being Used to Provide Service to Customers Serve the Public Interest by Putting Spectrum to Work.

While neither SpectrumCo nor Cox Wireless is currently using the AWS licenses to provide service to customers, each undertook significant efforts to develop the spectrum, but determined over time, as a business matter, that building out a network to provide a stand-alone facilities-based service would not provide a return that would warrant incurring the substantial costs and risks involved.⁸³ As a result, each made the business decision to sell the spectrum to Verizon Wireless, a provider that would make efficient and effective use of it. In similar circumstances – where licensees tried to develop their spectrum but the business case ultimately did not materialize – the Commission has found that assignment of licenses to a party able to put the spectrum to use would serve the public interest and would not harm competition. For example:

- AT&T-Qualcomm. From 2003 to 2008, Qualcomm acquired Lower 700 MHz D and E Block licenses through auction and the secondary market.⁸⁴ While Qualcomm

⁸² See Supplemental Stone Declaration at ¶¶ 47-48; Borth Declaration at ¶¶ 23-25.

⁸³ See Verizon Wireless-SpectrumCo Public Interest Statement at 20-23; Verizon Wireless-SpectrumCo Application, Exh. 4 (Declaration of Robert Pick, Chief Executive Officer of SpectrumCo, LLC) (“Pick Declaration”) at ¶¶ 3-16; Verizon Wireless-Cox Wireless Application, Exh. 1 (“Verizon Wireless-Cox Wireless Public Interest Statement”) at 18-20; Verizon Wireless-Cox Wireless Application, Exh. 4 (Declaration of Suzanne Fenwick, Executive Director for Corporate Development for Cox Communications, Inc.) (“Fenwick Declaration”) at ¶¶ 3-7.

⁸⁴ Application of Qualcomm Incorporated and AT&T’s Mobility Spectrum LLC for Assignment of Authorization, File No. 0004566825, Declaration of David Wise, ¶¶ 4-6 (filed Jan. 13, 2011, amended Feb. 9, 2011).

initially offered a service (FLO TV) focused on delivery of mobile video content, the service proved not to be viable.⁸⁵ Qualcomm proposed to sell the spectrum to AT&T.⁸⁶ The Commission approved the transfer in December 2011, concluding it “would facilitate the transition of underutilized unpaired 700 MHz spectrum towards mobile broadband use, thereby supporting [the Commission’s] goal of expanding mobile broadband deployment throughout the country.”⁸⁷

- *Aloha-AT&T*. Aloha Partners acquired Lower 700 MHz C Block licenses at auction between 2002 and 2005, as well as through the secondary market.⁸⁸ It conducted two trials but did not use the licenses to provide commercial wireless service.⁸⁹ Aloha found that it would need to partner with a “national wireless carrier or other companies that have the financial ability and expertise ... to ensure the roll out of a 700 MHz network and associated services as an economically valuable enterprise.”⁹⁰ It had not found such a partner at the time it decided to sell the spectrum licenses to AT&T.⁹¹ Finding that the proposed transaction would serve the public interest, the Commission approved the transaction in January 2008.⁹²
- *NextWave-Cingular*. In 2003, NextWave agreed to sell disaggregated portions of certain 30 MHz PCS C Block licenses to Cingular Wireless.⁹³ NextWave had obtained the licenses at auction in 1996 and 1997, but they were tied up in litigation for many years.⁹⁴ The Commission noted that, while Cingular was acquiring additional spectrum in areas where it already operated, the spectrum acquisition would not “affect the number of [then] active competitors in any of the markets

⁸⁵ *Id.* at ¶¶ 8, 10.

⁸⁶ *Id.* at ¶ 13.

⁸⁷ *AT&T-Qualcomm Order* at ¶¶ 94, 96.

⁸⁸ *Aloha Spectrum Holdings Company LLC and AT&T Mobility II LLC*, Memorandum Opinion and Order, 23 FCC Rcd 2234, 2235 ¶ 4 (2008) (“*Aloha-AT&T Order*”); *see also Lower 700 MHz Band Auction Closes*, Public Notice, 17 FCC Rcd 17272, Attachments A, B (WTB 2002); *Lower 700 MHz Band Auction Closes*, Public Notice, 18 FCC Rcd 11873, Attachments A, B (WTB 2003); *Auction of Lower 700 MHz Band Licenses Closes*, Public Notice, 20 FCC Rcd 13424, Attachments A, B (WTB 2005).

⁸⁹ Application to Assign Licenses Held by Aloha Spectrum Holdings Company LLC to AT&T Mobility II LLC, File No. 0003205282, Declaration of Charles C. Townsend, President and CEO, Townsend Enterprises II, ¶¶ 4, 6 (filed Oct. 23, 2007, and subsequently amended).

⁹⁰ *Id.* at ¶ 8.

⁹¹ *Id.*

⁹² *Aloha-AT&T Order*, 23 FCC Rcd at 2237-38 ¶¶ 13-14.

⁹³ *NextWave Personal Communications, Inc. and Cingular Wireless LLC*, Memorandum Opinion and Order, 19 FCC Rcd 2570, 2572-73 ¶¶ 4-5 (2004) (“*NextWave-Cingular Order*”).

⁹⁴ *Id.* at 2571 ¶ 2.

involved given the fact that NextWave ... ha[d] limited operations and trial (non-paying) customers in [those] markets.”⁹⁵ The Commission approved the transaction in February 2004.⁹⁶

In this circumstance, like those above, approval of the license assignments to facilitate putting this spectrum to efficient use to serve consumers will advance the public interest.

Nonetheless, various commenters assert that SpectrumCo and Cox engaged in trafficking of spectrum or improperly warehoused their spectrum. These assertions can be readily dismissed.

1. SpectrumCo Complied with All Relevant Commission Rules.

As explained in the Public Interest Statement, SpectrumCo did not acquire the AWS licenses for the principal purpose of speculation or profitable resale and has complied fully with the Commission’s anti-trafficking rules. Rather, SpectrumCo engaged in extensive and time-consuming efforts to investigate the provision of mobile broadband service, and ultimately concluded that provision of such service on a stand-alone basis did not make operational and economic sense.

SpectrumCo’s Members Investigated Opportunities to Develop an Advanced Wireless Network But Ultimately Determined to Sell the Spectrum Licenses. SpectrumCo acquired the AWS licenses at auction in 2006 to put its owners in a position to provide their customers with a wireless service. Since then, SpectrumCo has expended significant efforts, including spending more than \$20 million and conducting onsite inspections around the country, to clear or confirm the clearance of more than 500 incumbent wireless point-to-point microwave links from the AWS spectrum, including links that affected the spectrum that was transferred to Cox Wireless.⁹⁷

As Dr. Borth explains in the attached declaration, “the need to identify, negotiate, and relocate

⁹⁵ *Id.* at 2584 ¶ 31 (quoting the parties’ application at 11-12).

⁹⁶ *Id.* at 2591 ¶ 48.

⁹⁷ Pick Declaration at ¶ 3.

incumbent users is critical to making the spectrum commercially usable, but adds to the time needed to start up a new system operating in the AWS spectrum.”⁹⁸

The AWS band was in its infancy at the time of the auction, and there were many unanswered questions about the spectrum and no off-the-shelf equipment available for use in the band. As a result, it was necessary for SpectrumCo to undertake significant testing and analysis of the spectrum. Between 2007 and 2009, SpectrumCo created and operated an AWS 4G technology test bed in King of Prussia, Pennsylvania to evaluate the three leading 4G technology candidates at that time: WiMAX, Ultra Mobile Broadband (“UMB”), and Long Term Evolution (“LTE”). Among other things, SpectrumCo subjected each 4G technology to a set of live, operational tests over a period of several months, installing transmission equipment at several outdoor cell sites and testing prototype handsets with each 4G technology.⁹⁹ After the King of Prussia tests, SpectrumCo also collaborated with Nortel on LTE testing in the AWS band. SpectrumCo obtained performance data from the multi-site LTE system at Nortel’s Ottawa, Canada research and development facility. SpectrumCo also leased spectrum to original equipment manufacturers, including Qualcomm, Nokia, and Samsung, to test devices for use in the AWS band.

⁹⁸ Borth Declaration at ¶ 37; *see AWS-1 Service Rules Order*, 18 FCC Rcd at 25190 ¶ 70 (“[G]iven the relocation and band clearance issues associated with these bands, it makes sense to adjust our usual ten-year license term ... [to 15 years].”) RCA argued in 2003 that “because the ... [AWS] spectrum is heavily encumbered by Federal and non-Federal users that need to be relocated, and in recognition of other obstacles to deployment of the spectrum, ... the Commission should set initial license terms at 15 years.” Comments of the Rural Cellular Association, WT Docket No. 02-353, at 8 (filed Feb. 7, 2003). RCA cannot now credibly claim that SpectrumCo’s band clearing efforts were not serious and substantial and in furtherance of putting this spectrum to use. *See* RCA at 16-19.

⁹⁹ Borth Declaration at ¶¶ 43-44. As Dr. Borth observes, “[t]he amount of time and resources devoted to the King of Prussia tests demonstrates that SpectrumCo was very serious about finding a way to use the AWS spectrum to provide wireless services to consumers.” *Id.* at ¶ 44.

SpectrumCo also explored the costs of building a wireless network and concluded that they were substantial – possible capital expenditures and cumulative negative net operating costs of approximately \$10-11 billion.¹⁰⁰ In addition, to be competitive with other providers, SpectrumCo would need to purchase from manufacturers the devices most attractive to consumers at cost-effective prices, and would also need to secure nationwide roaming agreements.

SpectrumCo also investigated a number of alternative ways that its owners might use the AWS spectrum to provide their customers with advanced wireless services, including acquisitions, joint ventures, and network sharing arrangements with other wireless companies. Ultimately, SpectrumCo entered into business arrangements with two nationwide wireless companies, Sprint Nextel and Clearwire. However, the arrangements with Sprint Nextel and Clearwire did not include use of the AWS spectrum. SpectrumCo determined, for a variety of reasons, that the Sprint Nextel/Clearwire arrangements would not provide a comprehensive and viable long-term wireless solution.

For all of these reasons, SpectrumCo's members reasonably concluded that, given the costs and complexities involved, there was no strategic or financial value in undertaking the very large investments and corresponding business risks necessary to become an additional facilities-based competitor in a crowded and competitive wireless marketplace. In addition, they had not been able to reach an agreement that made business sense with any other party for use of the

¹⁰⁰ See Verizon Wireless-SpectrumCo Public Interest Statement at 21; Pick Declaration at ¶ 11. In the attached declaration, Dr. Borth further describes the significant undertakings associated with planning and constructing a facilities-based wireless network with the AWS spectrum. Borth Declaration at ¶¶ 37-47 (describing the steps a new entrant must take to relocate incumbents, determine how to use the spectrum most efficiently, and initiate buildout).

spectrum. As a result, SpectrumCo decided that selling the AWS licenses to Verizon Wireless was the best option and an efficient way to put the spectrum to use for the benefit of consumers.

Assertions that SpectrumCo “Trafficked” in the AWS Spectrum Are Baseless and Refuted By the Record. Nor do commenters provide any evidence to support a claim that SpectrumCo improperly “trafficked” in the AWS spectrum. The Commission has found that Congress “was not concerned with the trafficking and warehousing of licenses awarded in competitive auctions, which guarantee a price set by market forces” and was instead “confident that ‘[i]n the system of open competitive bidding, trafficking in licenses should be minimal, since the winning bidder would have paid a market price for the license.’”¹⁰¹ The Commission further explained that “the auction process, by requiring initial licensees to pay market value for their authorizations, effectively safeguards against ... speculation.”¹⁰² Accordingly, the Commission has properly rejected trafficking claims in recent wireless transactions involving auctioned licenses.¹⁰³ The Commission should do the same here, especially given the record of SpectrumCo’s significant efforts, as described in the last section, to develop the AWS band and the significant market developments that occurred after the auction.¹⁰⁴

¹⁰¹ *AT&T Inc. and Cellco Partnership d/b/a Verizon Wireless*, Memorandum Opinion and Order, 25 FCC Rcd 8704, 8768-69 ¶ 152 (2010) (“*AT&T-Verizon Wireless Order*”) (citing H.R. REP. NO. 103-111 at 257 (1993), *reprinted in* 1993 U.S.C.C.A.N. 378, 584).

¹⁰² *Forbearance From Applying Provisions of the Communications Act to Wireless Telecommunications Carriers*, First Report and Order, 15 FCC Rcd 17414, 17429 ¶¶ 32-33 (2000).

¹⁰³ *See, e.g., AT&T-Verizon Wireless Order*, 25 FCC Rcd at 8769 ¶ 153 (“[T]he transfer of licenses awarded pursuant to competitive bidding will seldom raise any trafficking concerns.”).

¹⁰⁴ In its effort to manufacture a claim of trafficking, RCA relies almost exclusively on stray statements of Comcast executives – specifically, a single remark by Comcast CFO Michael Angelakis in responding to a question at the Citi Media conference in January. *See RCA* at 17; *see also MetroPCS* at 3 n.9. He said that “[w]e never really intended to build that spectrum.” This remark was meant to convey the thought process following the years of evaluation and analysis, not SpectrumCo’s intentions at the time the AWS licenses were acquired.

2. Cox Similarly Complied With All Relevant Commission Rules.

Contrary to the suggestions of some parties,¹⁰⁵ Cox Wireless and its parent company, Cox, did not warehouse its spectrum, and in fact invested considerable resources in deploying a wireless service. Cox ultimately was unsuccessful, but continues to have a strong commitment to the wireless marketplace and to pursue mobile opportunities for its customers.

Cox Devoted Significant Resources to Developing a Wireless Service for Its Customers.

Cox acquired its spectrum licenses in 2008 and 2009, through participation in the Commission's 700 MHz auction (where it won a total of 22 licenses that are not part of this proceeding) and by redeeming its interests in SpectrumCo (which provided Cox with approximately 30 AWS licenses covering much of its cable service area). In October 2008, Cox announced its plan to add wireless to its bundle of communications and entertainment services. Cox's research had shown that consumers wanted an easy-to-use wireless service that provided seamless access to content while improving productivity through enhanced voice and data applications. Cox planned to use the AWS spectrum for a 3G CDMA-EVDO network in key locations and then to deploy a 4G service using a combination of AWS and 700 MHz spectrum. Cox undertook an

SpectrumCo's actions, described above, speak for themselves. In addition, Mr. Angelakis has spoken many times on SpectrumCo's strategic thinking and his comments demonstrate that SpectrumCo was fully engaged in exploring ways to use the AWS spectrum. For example, in 2009, he stated that SpectrumCo was looking into how to take existing data, voice and video products "and add mobility to them to enhance the product set." Statement of Michael J. Angelakis, CFO & EVP, Comcast Corporation, Goldman Sachs Communacopia Conference, Transcript at 5 (Sept. 16, 2009). Time Warner Cable's CEO has said the same. Statement of Glenn Britt, CEO, Time Warner Cable Inc., Q4 2010 Time Warner Cable Inc. Earnings Conference Call (Jan. 27, 2011) ("On wireless ... I think we've been pretty consistent. We are basically exploring whether packaging wireless data with our wireline offerings is something that consumers want and if there's a formula that people want. So we're trying different models, different products, what have you ..."). These statements are fully consistent with the record of SpectrumCo's actions over the past five years to clear the AWS spectrum, develop it, and explore potential uses of it as part of a viable long-term business plan.

¹⁰⁵ See, e.g., Petition to Deny of the New Jersey Division of Rate Counsel ("New Jersey Division of Rate Counsel") at 14.

ambitious construction effort, coupled with a “quick to market” strategy as an MVNO to offer 3G service to consumers in Cox’s cable footprint. Cox invested hundreds of millions of dollars in network planning, equipment and device purchases, cell tower construction and leasing, and back office and customer facing systems. In 2009 and 2010, Cox entered into vendor contracts, accelerated hiring of wireless personnel, leased and constructed cell sites, and began network trials.¹⁰⁶

Key milestones in Cox’s construction efforts include the following:

- March 2009 – Selected a cell site acquisition, design, and construction vendor to help with network construction.
- March 2009 – Selected a network equipment provider to provide an end-to-end CDMA solution.
- May 2009 – Announced an agreement with a provider of data management products and service controller functions.
- January 2010 – Announced successful trials in San Diego and Phoenix of IMS-based voice calling and high-definition video streaming over a 4G LTE network using Cox’s AWS and 700 MHz spectrum.¹⁰⁷
- January 2010 – Selected a vendor to support Cox’s CDMA network by providing a broad suite of mobile messaging, roaming, and network solutions.

To build a customer base large enough to support its planned wireless network, Cox also moved quickly to enter the wireless market as an MVNO provider, launching retail services in three markets in November 2010 on Sprint’s CDMA-EVDO network.¹⁰⁸ The launch of Cox

¹⁰⁶ During this time, Cox was a leader in a consortium of smaller wireless service providers formed to address 700 MHz spectrum, equipment, and policy issues, whose work facilitated the development and modification of the Third Generation Partnership Project (“3GPP”) standards for Long Term Evolution for Band Class 12 operations.

¹⁰⁷ Press Release, Cox, Cox Successfully Demonstrates the Delivery of Voice Calling, High Definition Video Via 4G Wireless Technology (Jan. 25, 2010), <http://cox.mediaroom.com/index.php?s=43&item=469>.

¹⁰⁸ Press Release, Cox, Cox Unveils Unprecedented ‘Unbelievably Fair (SM)’ Wireless Plans, Bringing More Value to the Bundle (Nov. 19, 2010), <http://cox.mediaroom.com/>

Wireless was the culmination of substantial effort, including negotiations with handset manufacturers, in-depth market research, product design, and employee training. Providing service as an MVNO also allowed Cox to develop business processes to support its own network-based wireless offering.

Despite Substantial Effort and Expenditure, Cox Found It Uneconomic to Provide Its Own Wireless Service. Notwithstanding Cox’s extensive efforts, it soon became clear that Cox “would not be able to deploy a 3G mobile service on the AWS spectrum without sustaining unacceptably large losses.”¹⁰⁹ Specifically, Cox’s business plan, which relied on selling wireless service to customers within its cable footprint in 19 states spread across the country, ultimately was incompatible with the changing marketplace. Product differentiation and consumer acceptance depended heavily on bundling 3G wireless with Cox’s video and high speed Internet services, but the transition to 4G occurred much faster than Cox anticipated. Cox realized that demand for 4G services would far outpace Cox’s 3G network deployment efforts. As the Commission has recognized, “economics of scale are important in the mobile wireless industry.”¹¹⁰ Such scale was simply not achievable within Cox’s service territory as consumer interest shifted to 4G service, rendering it impossible for Cox to recoup its costs.

[index.php?s=43&item=516](http://cox.mediaroom.com/index.php?s=43&item=516). Cox continued to roll out resold service through mid-2011, ultimately offering service in eight markets. *See, e.g.*, Press Release, Cox, Cox Launches Wireless in Oklahoma (Mar. 29, 2011), <http://cox.mediaroom.com/index.php?s=43&item=538>; Press Release, Cox, Cox Launches Wireless in Rhode Island, Connecticut, Cleveland (May 17, 2011), <http://cox.mediaroom.com/index.php?s=43&item=543>; Press Release, Cox, Cox Launches Wireless in Roanoke and Northern VA (July 14, 2011), <http://cox.mediaroom.com/index.php?s=43&item=549>.

¹⁰⁹ Fenwick Declaration at ¶ 7.

¹¹⁰ *Fifteenth Report*, 26 FCC Rcd at 9715 ¶ 61.

Thus, in May 2011, Cox decided to decommission its 3G network and focus on the MVNO and its effort to deploy 4G service in the future.¹¹¹ Six months later, Cox realized that it would be unable to achieve the necessary scale as an MVNO; on November 15, 2011, Cox announced that it was discontinuing its Cox Wireless service altogether and would transition existing customers to other networks.¹¹² That process will conclude by March 30, 2012. As summarized in the declaration of Suzanne Fenwick, the Executive Director for Corporate Development at Cox Communications, attached to the Public Interest Statement, “[t]he decision to discontinue the Cox Wireless 3G service was based on the lack of wireless scale necessary to compete in the marketplace; the acceleration of competitive 4G networks in Cox’s territories, where Cox Wireless was limited by its MVNO agreement to providing 3G services; as well as the cost and complexities associated with obtaining wireless devices most attractive to consumers.”¹¹³

3. SpectrumCo and Cox Wireless Have Fully Complied with the Commission’s Buildout Rules.

Two commenters, Free Press and The New Jersey Division of Rate Counsel, improperly seek to use this proceeding to challenge the Commission’s AWS buildout rules, arguing that the 15-year initial license period is too long and flexible.¹¹⁴ These challenges to the existing buildout rules are beyond the scope of the Commission’s analysis of these transactions.

¹¹¹ See Fenwick Declaration at ¶ 5. Although Cox had initiated successful network trials in two markets, Cox had not deployed commercial service over the 3G network. See *id.*

¹¹² Contrary to the suggestion of Free Press, this decision came before Cox’s agreements with Verizon Wireless. See Free Press at 24 n.33.

¹¹³ Fenwick Declaration at ¶ 7; see also Press Release, Cox, Cox Communications to Discontinue Cox Wireless Service, Effective March 30, 2012 (Nov. 15, 2011), <http://cox.mediaroom.com/index.php?s=43&item=569>.

¹¹⁴ Free Press at 36; New Jersey Division of Rate Counsel at 10-17.

As noted, the Commission properly determined that an initial term of 15 years was appropriate for AWS licenses due to the significant time and resources required to relocate incumbent users from the spectrum, to test and develop compatible technologies, and to implement other aspects of wireless deployment.¹¹⁵ At the end of this initial 15-year period, upon application for renewal, AWS licensees must show that they are providing “substantial service” in their license areas.¹¹⁶ The fact that SpectrumCo and Cox Wireless are not at this time providing service – after only one-third of their 15-year initial license periods – presents no compliance issue under the buildout rules.

II. THE TRANSACTIONS WILL NOT REDUCE COMPETITION.

The spectrum transactions before the Commission involve only the assignment of spectrum – nothing more. In such spectrum-only transactions – despite the entreaties of some commenters – the Commission appropriately limits its competitive analysis to the impact of the spectrum acquisition. As the Commission explained in its December 2011 *AT&T-Qualcomm Order*: “This transaction does not result in the acquisition of wireless business units and customers or change the number of firms in any market, so our competitive analysis considers only the competitive effects associated with the increases in spectrum that would be held by AT&T post-transaction.”¹¹⁷ The same approach governs here.

¹¹⁵ See *supra* note 98.

¹¹⁶ See 47 C.F.R. § 27.14(a) (defining “substantial service” as “service which is sound, favorable, and substantially above a level of mediocre service which just might minimally warrant renewal”). In the *AWS-1 Service Rules Order*, the Commission agreed with RCA, the sole commenter on the issue, and specifically declined to adopt interim performance requirements “to provide flexibility to licensees to implement their business plans.” *AWS-1 Service Rules Order*, 18 FCC Rcd at 25193 ¶ 77. The Commission determined a substantial service requirement would provide AWS licensee with “the flexibility required to accommodate the new and innovative services that ... will be forthcoming in these bands.” *Id.* at 25192 ¶ 75.

¹¹⁷ *AT&T-Qualcomm Order* at ¶ 29; see also Katz Declaration at ¶¶ 11-19.

A. The License Assignments Will Not Cause Potential Competitive Harms in Any Affected Local Wireless Market.

While commenters make general claims about diminution of competition,¹¹⁸ they fail to present specific facts or data about the impact of the transactions in any affected market – the lodestar of the Commission’s competitive analysis of wireless transactions. In disposing of generalized claims similar to those raised by the same parties here, the Commission recently made clear that petitions to deny will be rejected where, as here, they fail to present “facts or evidence” that “specific competitive harm” would result in the markets at issue:

RTG fails to raise any substantive issues, or discuss any specific competitive harm, that would result from our approval of the particular transaction before us involving any of these [affected markets]. Instead, RTG raises, in general terms, its concern[s]

... RTG and RCA have provided no specific allegations of fact with respect to the instant transaction.¹¹⁹

Accordingly, commenters’ speculative claims about competitive harms must be rejected. That commenters do not contest the facts and data presented by Applicants or address the competitive conditions in the markets at issue only underscores the lack of any potential competitive harm.¹²⁰

As explained in the Applications, the Commission uses three “screens” to identify markets where there may be potential competitive harms and thus warrant analysis. Two of the screens, which both pertain to changes to the post-transaction Herfindahl-Herschman Index

¹¹⁸ See, e.g., Free Press at 14, 20-24; New Jersey Division of Rate Counsel at 19-21, 30; NTCH at 1-2, 4-5; Public Knowledge at 22-23; RCA at 8-10, 26-30; RTG at 11-15; Petition to Deny of Members of the Rural Broadband Policy Group *et al.* (“Rural Broadband Policy Group”) at 2; Sprint Nextel at 16.

¹¹⁹ *New Cingular Wireless PCS, LLC and D&E Investments, Inc.*, Order, DA 12-232, ¶¶ 6-7 (WTB rel. Feb. 16, 2012) (“*New Cingular-D&E Order*”); see also *AT&T Mobility Spectrum LLC and BTA Ventures II, Inc.*, Order, DA 12-234, ¶¶ 6-8 (WTB rel. Feb. 16, 2012) (“*AT&T-Mobility-BTA Ventures Order*”).

¹²⁰ One commenter seeks granular market-by-market data, yet offers no basis as to why such data is necessary. See RCA at 21-22.

(“HHI”), do not apply here because these are spectrum-only transactions.¹²¹ The third screen is designed to “identify markets where the spectrum amounts held by a transferee post-transaction provide reason for further competitive analysis of spectrum concentration.”¹²² This “spectrum” screen is 145 MHz in nearly all markets nationally,¹²³ which is approximately one-third of the spectrum deemed “suitable” for mobile telephony/broadband services.¹²⁴ Where this screen is not exceeded, the Commission conducts no further inquiry: “[T]he purpose of this initial screen is to *eliminate from further review* those markets in which there is clearly no competitive harm relative to today’s generally competitive marketplace.”¹²⁵

The overwhelming majority of the markets at issue are below the spectrum screen: 121 of the 136 markets included in these transactions¹²⁶ – or approximately 89 percent – are below

¹²¹ See *AT&T-Qualcomm Order* at ¶ 31 n.91 (holding that, “[b]ecause the instant transaction does not result in the acquisition of wireless business units and customers or change the number of firms in any market, we do not apply an initial screen based on the size of the post-transaction Herfindahl-Hirschman Index (‘HHI’) of market concentration and the change in the HHI”).

¹²² *AT&T-Qualcomm Order* at ¶ 31; see also *AT&T-Verizon Wireless Order*, 25 FCC Rcd at 8720-8721 ¶ 32.

¹²³ *Cellco Partnership d/b/a Verizon Wireless and Atlantis Holdings LLC*, Memorandum Opinion and Order and Declaratory Ruling, 23 FCC Rcd 17444, 17473 ¶ 53, 17477-78 ¶ 64 (2008) (“*Verizon Wireless-ALLTEL Order*”) (noting that the screen includes those spectrum bands designed for cellular, PCS, SMR and 700 MHz services, as well as AWS-1 and BRS spectrum), *recon. denied*, 26 FCC Rcd 11763 (2011).

¹²⁴ See *AT&T-Qualcomm Order* at ¶ 38; *Fifteenth Report*, 26 FCC Rcd at 9827 ¶ 281.

¹²⁵ *Sprint Nextel Corp. and Clearwire Corp.*, Memorandum Opinion and Order, 23 FCC Rcd 17570, 17601 ¶ 76 (2008) (“*Sprint Nextel-Clearwire Order*”) (emphasis added); see also *AT&T Wireless Services, Inc. and Cingular Wireless Corp.*, Memorandum Opinion & Order, 19 FCC Rcd 21522, 21569 ¶ 109 (2004) (“*AT&T Wireless-Cingular Order*”).

¹²⁶ The SpectrumCo licenses cover areas within 120 Basic Economic Areas (“BEAs”) and one Regional Economic Area Grouping (“REAG”) (Hawaii). See *Verizon Wireless-SpectrumCo Public Interest Statement* at 1. The Cox Wireless licenses cover areas within 29 BEAs. See *Verizon Wireless-Cox Wireless Public Interest Statement* at 1. Although the actual geographic areas covered by the licenses do not overlap, see *Verizon Wireless-Cox Wireless Application*, Exh. 3 at 1, 13, there are a number of BEAs in which there is more than one license. As a result, there are 135 BEA markets and one REAG market included in the combined transactions. The

the threshold. Verizon Wireless’ post-transaction spectrum holdings would remain below the screen in 2,531 of the 2,577 counties covered by the SpectrumCo and Cox Wireless licenses¹²⁷ – or in more than 98 percent of all the covered counties. Indeed, of the approximately 287 million POPs covered by the AWS licenses, approximately 281.8 million POPs – or 98 percent – are located in areas where the screen is not exceeded. Putting aside the fact that the existing screen does not include additional spectrum that some competitors are in fact using to provide mobile services (such as the PCS G Block and the EBS spectrum),¹²⁸ and even limiting the analysis to the 422 MHz of spectrum that the Commission treats as available and suitable for mobile telephony/broadband services,¹²⁹ no review is appropriate in these areas under Commission precedent. According to the Commission, “there is no need for additional analysis where there [i]s at least [two-thirds of the mobile telephony spectrum] available to other firms to compete in the provision of mobile telephony services.”¹³⁰

screen is triggered in only 15 of the BEA markets. *See* Verizon Wireless-SpectrumCo Public Interest Statement at 24-25; Verizon Wireless-SpectrumCo Application, Exh. 7 at 1-3; Verizon Wireless-Cox Wireless Public Interest Statement at 21.

¹²⁷ As noted in the Applications, Verizon Wireless would remain below the screen in 2,230 of the 2,276 of the counties covered by the SpectrumCo licenses and in all 303 counties covered by the Cox Wireless licenses. *See* Verizon Wireless-SpectrumCo Public Interest Statement at 25; Verizon Wireless-SpectrumCo Application, Exh. 5 and Exh. 7 at 2; Verizon Wireless-Cox Wireless Public Interest Statement at 21; Verizon Wireless-Cox Wireless Application, Exh. 5. Although the actual geographic areas covered by the licenses do not overlap, SpectrumCo and Cox Wireless each holds licenses that encompass non-overlapping partitioned portions of the same two counties (Santa Barbara and Orange Counties in California). As a result, the combined total number of counties covered by the licenses is 2,577, of which the screen is exceeded in only 46 counties. *See* Verizon Wireless-SpectrumCo Public Interest Statement at 28. These figures take into account spectrum Verizon Wireless proposes to acquire from Leap Wireless, Savary Island License A, and Savary Island License B, in separate transactions pending before the FCC.

¹²⁸ *See infra* notes 180-181 and accompanying text.

¹²⁹ *See infra* note 157 and accompanying text.

¹³⁰ *AT&T Inc. and Dobson Communications Corp.*, Memorandum Opinion and Order, 22 FCC Rcd 20295, 20313 ¶ 30 (2007) (“*AT&T-Dobson Order*”); *see also id.* at 20317 ¶ 39.

B. Competition Will Remain Robust Even in the Few Areas Where the Screen Is Exceeded.

Even in the relatively few BEAs where the spectrum screen is exceeded, there will be no adverse competitive effects.¹³¹ Nor does any commenter offer any facts or evidence that the transactions will result in harmful spectrum aggregation in any geographic area where the screen is exceeded.

The impact of the proposed assignments on factors relevant to the Commission’s analysis is so small here that there is no basis for concern.¹³² Factors that normally would be taken into account in the merger context – for example, whether there will be a reduction in the number of competitors providing service or an increase in market share – are not relevant here.¹³³ Here, the total number of counties exceeding the screen is extremely small. In most of these counties, the total amount of spectrum by which the screen is exceeded also is small, in some cases only two MHz, and in all cases there are many other companies that hold ample spectrum that could be used to compete against Verizon Wireless.¹³⁴ Specifically, the spectrum screen is triggered in only 46 counties located in 15 of the 136 geographic areas at issue in the transactions.¹³⁵ These

¹³¹ See generally Verizon Wireless-SpectrumCo Public Interest Statement at 26-33; Verizon Wireless-SpectrumCo Application, Exh. 7.

¹³² See Verizon Wireless-SpectrumCo Public Interest Statement at 26-27.

¹³³ See *id.* (citing *Aloha-AT&T Order*, 23 FCC Rcd at 2237 ¶ 12; *Cellco Partnership d/b/a Verizon Wireless and Rural Cellular Corp.*, Memorandum Opinion and Order and Declaratory Ruling, 23 FCC Rcd 12463, 12497 ¶ 70 (2008) (“*Verizon Wireless-RCC Order*”)).

¹³⁴ See Verizon Wireless-SpectrumCo Public Interest Statement at 28-29; Verizon Wireless-SpectrumCo Application, Exh. 7.

¹³⁵ These 46 counties represent only 1.79 percent of the 2,577 total counties covered by SpectrumCo’s and Cox Wireless’ AWS licenses, and according to U.S. Census Bureau figures, their combined 2010 population is 5,170,466 (only about 1.82 percent of the total population covered by these licenses).

15 BEAs include 18 Cellular Market Areas (“CMAs”).¹³⁶ In eight of these CMAs the spectrum screen is exceeded by four MHz or less, and in 14 CMAs the overage is nine MHz or less.

The Commission has found “[t]he presence and capacity of rival service providers, taking into account near-term opportunities to obtain access to additional spectrum, are such ... that the response of these rival service providers would likely be sufficient to deter any unilateral actions or anticompetitive behavior.”¹³⁷ As *Exhibit 5* hereto shows, in each of the counties where the spectrum screen is triggered, multiple licensees hold “in-screen” spectrum. Indeed, in each of the counties there are at least six holders of in-screen spectrum in addition to Verizon Wireless, and in half of these counties there are eight or more. These licensees are either competing today, could enter the market and compete, or could assign their spectrum to others seeking to compete, and no commenter shows why they could not do so.¹³⁸ Moreover, as discussed further below, there are additional spectrum bands that, while not yet included in the spectrum screen, nonetheless support or could support multiple providers in the mobile telephony/broadband market.¹³⁹

Further, Commission standards developed in its review of wireless mergers involving the transfer of operations and customers – a more intensive review than this one – provide support for a finding of no harm to competition in the few markets here where the spectrum screen is

¹³⁶ There are more CMAs than BEAs because four of the BEAs include all or parts of more than one CMA.

¹³⁷ *Verizon Wireless-ALLTEL Order*, 23 FCC Rcd at 17490-17491 ¶ 98; *see also AT&T Inc. and Centennial Communications Corp.*, Memorandum Opinion and Order, 24 FCC Rcd 13915, 13948-49 ¶ 76 (2009) (“*AT&T-Centennial Order*”).

¹³⁸ *See generally* Free Press at 9, 24; NTCH at 1-2, 4; Public Knowledge at 22; RCA at 9-10, 26-30; RTG at 11, 14; Rural Broadband Policy Group at 2. Both SpectrumCo and Cox Wireless have made clear that they decided not to enter the market for reasons independent of these transactions. *See supra* Section I.E.

¹³⁹ *See infra* Section II.D.

triggered. The Commission considers the presence of at least four post-transaction competing providers as a significant factor in finding no likelihood of competitive harm.¹⁴⁰ Here, in all but one of the relevant CMAs,¹⁴¹ there will be four post-transaction competitors: three other nationwide facilities-based providers (*i.e.*, AT&T, Sprint, and T-Mobile) in addition to Verizon Wireless that are currently offering wireless service in every screen-triggered county. And in most of these CMAs, additional providers beyond the four national carriers also are operational.

C. Commenters Fail to Demonstrate Any Competitive Harm at a National Level.

Perhaps recognizing that the transactions require no further competitive analysis in all but a handful of geographic areas – and even in those geographic areas, there is no evidence of competitive harm – commenters attack the transaction under a variety of novel theories. None of these theories, however, has ever been adopted by the Commission as a basis to deny or condition a license assignment – nor is there any basis to adopt them now.

Some commenters, including T-Mobile, claim that the transactions will somehow harm competition at the national level, without substantiating how a mere transfer of spectrum would cause such a result.¹⁴² Their claims can be quickly rejected, and T-Mobile’s advocacy is in direct conflict to its own CEO’s congressional testimony last year: “The U.S. wireless marketplace is

¹⁴⁰ See *AT&T-Centennial Order*, 24 FCC Rcd at 13948 ¶ 76 (citing the presence of four or more competitors post-transaction as a basis for finding “no competitive concerns requiring remedy”); *Verizon Wireless-ALLTEL Order*, 23 FCC Rcd at 17490-91 ¶ 98 (finding that the presence of four or more operational competitors post-transaction justified a determination that competitive harm is unlikely).

¹⁴¹ In this CMA (Minnesota 5 – Wilkin CMA (CMA486)), there will remain both before and after the transactions four competitors in one of the screen-triggered counties (Swift County) and two competitors in the other two screen-triggered counties (Big Stone and Traverse Counties).

¹⁴² See Free Press at 18-19, 37; RCA at 10-12, 41-42, 44-46.

very competitive. Approximately three-quarters of Americans today live in areas contested by at least five facilities-based wireless providers.”¹⁴³

First, as T-Mobile acknowledges, the national mobile wireless marketplace is highly competitive, driven not only by vibrant rivalry among carriers, but also by the combinations of devices, operating systems, applications, and content that comprise today’s consumer offerings.¹⁴⁴ In today’s wireless marketplace, mobile carriers simultaneously cooperate and compete with providers of services that both complement and substitute for their own products. This mobile ecosystem has led to the precise outcomes expected from a robustly competitive market: constant innovation, falling prices, substantial investment, and entry by new providers in various sectors. For example:

- *Prices keep dropping.* The trend towards lower prices and greater value has intensified, with voice revenue per customer declining 30 percent from \$47 to \$33 per month between 2005 and 2010, price per message declining 84 percent from 5.7 cents to 0.9 cents over that same period, and price per megabyte of data service declining nearly 90 percent from 47 cents to 5 cents between 2008 and 2010.¹⁴⁵
- *Investment is growing.* Despite adverse national economic conditions, competitive rivalry is driving billions of dollars into 3G and 4G network deployments. Mobile wireless providers invested almost \$25 billion in 2010, a 22 percent increase over

¹⁴³ *The AT&T/T-Mobile Merger: Is Humpty Dumpty Being Put Back Together Again? Before the S. Comm. On the Judiciary, Subcomm. Antitrust, Competition Policy and Consumer Rights*, 112th Cong. (2011) (statement of Phillip Humm, CEO, T-Mobile USA) at 3, <http://www.judiciary.senate.gov/pdf/11-5-11%20Humm%20Testimony.pdf>.

¹⁴⁴ See generally JONATHAN SALLET, THE INTERNET ECOSYSTEM AND LEGAL REGIMES: ECONOMIC REGULATION SUPPORTING INNOVATION DYNAMISM (Nov. 11, 2011), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1957715; JONATHAN SALLET, THE CREATION OF VALUE: THE BROADBAND VALUE CIRCLE AND EVOLVING MARKET STRUCTURES (Apr. 4, 2011), <http://www.annenberglab.com/viewresearch/27>; JEFFREY EISENACH, THEORIES OF BROADBAND COMPETITION (Jun. 20, 2011) http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1868381; Comments of Verizon Wireless, WT Docket No. 11-186 (filed Dec. 5, 2011) (“Verizon Wireless 2011 Competition Comments”).

¹⁴⁵ Roger Entner, *What is the price of a megabyte of wireless data?*, FIERCEWIRELESS, Apr. 13, 2011, <http://www.fiercewireless.com/story/entner-what-price-megabyte-wireless-data/2011-04-13> (citing Recon Analytics and Nielsen data).

2009.¹⁴⁶ Since 2001, America’s wireless carriers have made an average combined investment of more than \$22.8 billion per year.¹⁴⁷ This trend shows no sign of slowing, as carriers invested \$12.7 billion during the first half of 2011 alone.¹⁴⁸

- *Numerous and diverse providers compete.* The U.S. mobile wireless marketplace includes 181 facilities-based mobile providers,¹⁴⁹ including national providers, regional carriers, and numerous smaller entities that are deploying 3G and 4G services. In addition, there are approximately 40 to 60 resellers/ MVNOs.¹⁵⁰
- *Customer satisfaction is high.* The FCC in 2010 found that 92 percent of surveyed cell phone users are very satisfied or somewhat satisfied with their cell phone service.¹⁵¹ Consumer Reports’ January 2012 edition observed that six out of seven conventional contract providers scored between 67 (“fairly well satisfied”) and 87 (“very satisfied”) – an improvement over the previous year.¹⁵² American Customer Satisfaction Index recently found that wireless consumer satisfaction remains strong and has increased substantially since 2004.¹⁵³

Second, the transactions will do nothing to harm this competition at the national level.

Customers will have the same competitive choices post-transaction as they do today, and will enjoy the same positive trends detailed above. Moreover, this robust national competition also restrains unilateral or coordinated anticompetitive effects in local areas. Today, for example, most pricing and advertising strategies are set at the national level, thereby minimizing the

¹⁴⁶ ROBERT F. ROCHE & LIZ DALE, CTIA, CTIA’S WIRELESS INDUSTRY INDICES 137, 139 (May 2011).

¹⁴⁷ See *id.* at 143.

¹⁴⁸ See ROBERT F. ROCHE & LIZ DALE, CTIA, CTIA’S WIRELESS INDUSTRY INDICES: MID-YEAR 2011 RESULTS 144 (Nov. 2011).

¹⁴⁹ See, e.g., INDUSTRY ANALYSIS AND TECHNOLOGY DIVISION, FCC, LOCAL TELEPHONE COMPETITION: STATUS AS OF DECEMBER 31, 2010, at 28 tbl.17 (Oct. 2011), http://transition.fcc.gov/Daily_Releases/Daily_Business/2011/db1007/DOC-310264A1.pdf.

¹⁵⁰ See *Fifteenth Report*, 26 FCC Rcd at 9699 ¶ 34.

¹⁵¹ See JOHN HARRIGAN & ELLEN SATTERWHITE, AMERICANS’ PERSPECTIVES ON ONLINE COLLECTION SPEEDS FOR HOME AND MOBILE DEVICES 4, Exh. 2 (June 1, 2010), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-298516A1.pdf.

¹⁵² See *Best Phones & Service*, CONSUMER REPORTS, Jan. 2012, at 36.

¹⁵³ American Customer Satisfaction Index, Scores By Industry, Wireless Telephone Service, http://theacsi.org/index.php?option=com_content&view=article&id=147&catid=&Itemid=212&i=Wireless+Telephone+Service (last visited Feb. 29, 2012).

impact of local conditions on the wireless industry as a whole. As a result, these strong national forces also limit the potential for either unilateral action or coordinated interactions by carriers at the local level, further undercutting any claimed harms from these transactions.

Third, contrary to the assertions of some commenters,¹⁵⁴ Verizon Wireless' spectrum holdings post-transaction pose no concern under any "national" metric. Verizon Wireless' average spectrum holdings on a nationwide basis would be 109 MHz if the proposed transactions are approved.¹⁵⁵ This amount is well below the amount of spectrum that Sprint Nextel and its partner Clearwire hold. Sprint has an average spectrum depth of 50 MHz and Clearwire "is the largest holder of licensed wireless spectrum in the United States," with an average of 160 MHz in major markets.¹⁵⁶ Moreover, 109 MHz is also well below one-third of the 422 MHz of spectrum currently included in the spectrum screen.¹⁵⁷

If providers' nationwide spectrum holdings are examined on a nationwide MHz*POPs basis,¹⁵⁸ Verizon Wireless would hold approximately 26 percent of the spectrum included in that

¹⁵⁴ See Free Press at 18-19, 37; RCA at 10-12, 41-42, 44-46.

¹⁵⁵ See *supra* Section I.D.

¹⁵⁶ See Clearwire Corporation, Form 10-K (2011 Annual Report) at 14 (Feb. 16, 2012) ("Clearwire Annual Report") (stating that Clearwire "hold[s] approximately 140 MHz of spectrum on average across [its] national spectrum footprint and approximately 160 MHz of spectrum on average in the 100 largest markets in the United States," which makes it "the largest holder of licensed wireless spectrum in the United States"), <http://corporate.clearwire.com/secfiling.cfm?filingID=1445305-12-337&CIK=1442505>; see also Clearwire, Our Network: Clearwire Has More Spectrum Than Anyone, <http://www.clearwire.com/company/our-network> (last visited Feb. 7, 2012) ("[W]ith the merger of Clearwire and Sprint's 4G business in 2008, we increased our spectrum holdings far beyond any other provider in the country.").

¹⁵⁷ The 422 MHz consists of 80 MHz of 700 MHz, 50 MHz of cellular, 26.5 MHz of SMR, 90 MHz of AWS, 120 MHz of PCS, and 55.5 MHz of BRS spectrum.

¹⁵⁸ See, e.g., *AT&T-Qualcomm Order* at ¶ 45.

screen post-transaction.¹⁵⁹ Under this metric, approval of these transactions would still leave available for competitors roughly three quarters of the spectrum under the existing spectrum screen – an amount that the Commission recognized in the *AT&T-Qualcomm Order* as presenting no competitive concerns.¹⁶⁰ Of course, this metric presumes only spectrum currently included in the spectrum screen is counted. If other available bands are included, Verizon Wireless’ share of spectrum holdings would be even less.

A few commenters suggest that smaller carriers have a greater need for spectrum than larger carriers like Verizon Wireless, and therefore it would be inappropriate to grant these license assignments.¹⁶¹ As explained below, this claim is barred by Section 310(d) of the Act, which requires the Commission to focus on the transaction before it and not on other hypothetical transactions.¹⁶² Moreover, it is utterly unsupported by any data, and in any event ignores the substantial differences among operators that affect spectrum need, including the number of consumers served and the amount of data carried. Under this theory, a two-lane road should be given preference to add additional lanes before a multi-lane highway does, regardless of the significant difference in traffic volume and demand. Verizon Wireless has demonstrated that it needs more spectrum to address projections of mobile data growth, and that it uses

¹⁵⁹ AT&T would hold approximately 21 percent of the relevant spectrum post transaction; Sprint Nextel and Clearwire would hold approximately 25 percent (individually, Sprint Nextel would hold 12 percent and Clearwire would hold 13 percent, ignoring Clearwire’s 4G operations on EBS spectrum); and T-Mobile would hold approximately 13 percent.

¹⁶⁰ See *AT&T-Qualcomm Order* at ¶¶ 44-45 (“Under this [MHz*POPs] measure, implementation of this transaction would still leave available for competitors at the national level more than three quarter of the spectrum suitable for mobile voice or broadband service.”).

¹⁶¹ See, e.g., T-Mobile at 4-5, 13-15; NTCH at 2-3, 5; see also Free Press at 27. T-Mobile’s claim is particularly ironic since it is currently before the Commission seeking approval to acquire its own block of AWS spectrum. Moreover, T-Mobile sat out entirely the last major spectrum auction, declining even to file an application to bid for what it terms the “most valuable” below 1 GHz spectrum.

¹⁶² See *infra* Section II.E; see generally Katz Declaration at ¶¶ 14-22.

existing spectrum efficiently – showings that none of the commenters have rebutted, much less made for their own operations.¹⁶³

D. The Commission Should Reject Proposals to Develop New Spectrum Limits or Tests.

Recognizing that the Commission’s analytical tools for assessing spectrum aggregation dictate approval of these transactions, some commenters make what amount to collateral attacks on the Commission’s spectrum and competition review policies. They assert that the Commission should change its analytical tools and create new spectrum limits or tests in the context of these transactions. They ask for a new overall cap,¹⁶⁴ adjustments to the spectrum screen,¹⁶⁵ or examination of spectrum holdings consisting of “4G LTE-ready” spectrum.¹⁶⁶ As the FCC has determined, *ex ante* spectrum aggregation caps are ill-conceived as a matter of policy,¹⁶⁷ and there is no basis to adopt a new cap, revise the screen, or apply new spectrum tests in the context of these license assignments.

The sheer variety and complexity of the many proposals for new spectrum aggregation rules or screens underscores why the Commission should not take them up in this proceeding. Commenters disagree among themselves on what the new policies should be, for example offering multiple conflicting ways to “weight” or “value” spectrum for purposes of a new cap or

¹⁶³ See, e.g., ITIF at 2, 4.

¹⁶⁴ See RTG at 7, 18-19.

¹⁶⁵ See Free Press at 9-19; Public Knowledge at 47; RCA at 47-53; Sprint Nextel at 18-20; T-Mobile at 20-34.

¹⁶⁶ See RCA at 14-15, 23, 49; *see also* NTCH at 4.

¹⁶⁷ See 2000 Biennial Regulatory Review; *Spectrum Aggregation Limits for Commercial Mobile Radio Services*, Report and Order, 16 FCC Rcd 22668, 22670-71 ¶¶ 4-6 (2001) (“*Spectrum Cap Repeal Order*”) (eliminating “inflexible spectrum aggregation limits” in favor of case-by-case review, and recognizing that “a bright-line approach can be inflexible, potentially permitting problematic transactions and precluding transactions that would serve the public interest”).

screen. Taking up these proposals here would sidetrack the Commission's review. It also would inject issues that have nothing to do with the specific license transfers here, because, as explained above, no party has demonstrated any specific competitive or consumer harm or rebutted the demonstrated consumer benefits of these transactions. And that – not how some screen or cap is calculated – is the key fact that warrants denial of the objections to these license assignments.

The Commission historically has used the spectrum screen solely as an analytical tool to determine the level of spectrum holding below which no further review is necessary. Since 2004, the Commission has consistently used one-third of the total spectrum available for mobile use as the threshold,¹⁶⁸ providing all concerned with some measure of certainty as they consider transactions and formulate business plans. Use of a consistent one-third threshold also has meant that the amount of spectrum included in the screen in past transactions has increased to reflect the fact that over time, the Commission has made available more spectrum for mobile services. But, while the use of a one-third threshold has allowed the level of the screen to essentially self-correct for the availability of additional spectrum, the Commission has never strayed from its policy that the screen is simply a trigger for competitive review when more than one third of available spectrum would be held by one entity. Commenters ask the Commission to now depart dramatically from this long-established policy and radically revise its policy in various ways, such as by valuing different bands differently (and thereby altering the fundamental premise that all useable spectrum should be included) or by imposing an actual cap on spectrum holding.

¹⁶⁸ See *Fifteenth Report*, 26 FCC Rcd at 9827 ¶ 281 (citing *AT&T Wireless-Cingular Order*, 19 FCC Rcd at 21568-69 ¶ 109).

Those radical and sweeping changes to the Commission’s long-established policy are meritless,¹⁶⁹ and in any event should not be taken up in this transaction review.

Reinstatement of a Spectrum Cap Is Unwarranted. Fundamentally, prophylactic limits on spectrum holdings are bad policy, which is why the Commission repealed its spectrum “cap” years ago.¹⁷⁰ *Ex ante* aggregation limits can harm competition and consumers because they make it more difficult and costly (and, in some cases, impossible) for a service provider to expand when it has consumer demand for services that requires additional spectrum.¹⁷¹ As a result, consumers are harmed by a combination of higher prices, lower service quality, and diminished innovation in service offerings.¹⁷²

Moreover, there is no justification to impose a cap in the context of these transactions. The only commenter seeking a cap – RTG¹⁷³ – offers no specific facts or evidence that Verizon

¹⁶⁹ See Katz Declaration at 56-57.

¹⁷⁰ See *Spectrum Cap Repeal Order*, 16 FCC Rcd at 22670-71 ¶¶ 4-6, 22693-95 ¶¶ 47-53.

¹⁷¹ See generally MICHAEL L. KATZ, AN ECONOMIC ANALYSIS OF THE SPECTRUM COMPONENT OF THE FEDERAL COMMUNICATIONS COMMISSION’S MERGER REVIEW SCREEN 4 (Aug. 19, 2008) (“KATZ SPECTRUM SCREEN ANALYSIS”), appended as Att. 3 to Joint Opposition to Petitions to Deny and Comments of Verizon Wireless and Atlantis Holdings LLC, WT Docket No. 08-95 (filed Aug. 19, 2008) (“Verizon Wireless-ALLTEL Joint Opposition”).

¹⁷² *Id.*

¹⁷³ See RTG at 7, 18-19. As a threshold matter, the Commission must dismiss the petition filed by RTG for failure to plead and establish standing. Petitions to deny must “contain *specific* allegations of fact sufficient to show that the petitioner is a party in interest” and “[s]uch allegations of fact shall . . . be supported by affidavit of a person or persons with personal knowledge thereof.” 47 U.S.C. § 309(d)(1) (emphasis added); see also 47 C.F.R. § 1.939(d). To establish standing, RTG must not only show that grant of the transactions will cause its members “to suffer a direct injury” but also must demonstrate “that it is likely, as opposed to merely speculative, that the alleged injury would be prevented or redressed if the assignment applications are denied.” See *NextWave-Cingular Order*, 19 FCC Rcd at 2579-80 ¶ 21. RTG has failed to carry this burden. It does not identify any of its members, state that its members operate or hold CMRS licenses in the subject markets, or otherwise allege specific facts showing that its members directly compete with the Applicants in relevant markets. RTG at 1 n.1; see *NextWave-Cingular Order*, 19 FCC Rcd at 2579-80 ¶ 21 (petitioners must make “specific allegations of fact”). The Commission must dismiss RTG’s petition for failing to specifically

Wireless' spectrum holdings post-transaction will result in competitive harm in any particular market or geographic area subject to these transactions. The Bureau has recently rejected these efforts in another transaction,¹⁷⁴ and an open proceeding addresses RTG's concern.¹⁷⁵ In addition, the limit RTG proposes – 110 MHz of spectrum below 2.3 GHz – ignores the fact that more spectrum resources are coming into use every day via a variety of mechanisms. These additional resources, including the PCS G Block, BRS/EBS, MSS and WCS, and unlicensed alternatives like Wi-Fi,¹⁷⁶ make such a limit both unnecessary and irrational.

There Is No Basis to Revisit the Spectrum Screen Here. The Commission recently held, “[B]ecause under any version of the overall spectrum screen relatively few, or no, local markets are triggered for further competitive analysis, ... there is no need to formally address what spectrum should be included in the Commission’s spectrum screen at this time.”¹⁷⁷ The same finding applies here. Given the very limited areas where the post-transaction holdings would

plead and establish standing as to how grant of the instant transactions will result in a direct injury to RTG. *See AT&T Wireless PCS, Inc.*, Order, 15 FCC Rcd 4587, 4588 ¶ 3 (WTB/CWD 2000) (citing *Sierra Club v. Morton*, 405 U.S. 727, 733 (1972)).

¹⁷⁴ *See New Cingular-D&E Investments Order* at ¶¶ 6-7 (rejecting RTG’s request to consent to the assignment of spectrum to AT&T “only in markets where, post-transaction, AT&T would control less than 110 megahertz of total spectrum below 2.3 GHz,” citing the absence of specific facts or evidence to support such a finding in any of the markets at issue).

¹⁷⁵ *See Wireless Telecommunications Bureau Seeks Comment on Petition for Rulemaking of Rural Telecommunications Group, Inc. to Impose a Spectrum Aggregation Limit on All Commercial Terrestrial Wireless Spectrum Below 2.3 GHz*, Public Notice, 23 FCC Rcd 14875 (2008).

¹⁷⁶ *See, e.g.,* Steve Donohue, *Cablevision develops technology for WiFi-based mobile phone service*, FIERCECABLE, Feb. 3, 2012, <http://www.fiercecable.com/story/cablevision-develops-technology-wifi-based-mobile-phone-service/2012-02-03>.

¹⁷⁷ *AT&T-Qualcomm Order* at ¶ 41.

exceed the screen, requests that the Commission revisit the spectrum bands included in the screen in these transactions¹⁷⁸ are unwarranted.

In any event, even if certain spectrum bands were excluded from the screen,¹⁷⁹ any reduction in available spectrum would be more than offset by the following bands which, while not yet included in the spectrum screen, can support multiple potential new entrants in the mobile telephony/broadband market:

- 10 MHz PCS G Block, which is not included in the screen even though Sprint Nextel has announced plans to deploy LTE on this spectrum beginning later this year;¹⁸⁰
- At least 104.5 MHz of BRS/EBS spectrum, in addition to the 55.5 MHz of BRS currently included in the screen, as Clearwire recently stated it has 160 MHz in the top 100 markets;¹⁸¹
- 50 MHz of MSS ATC spectrum, which is not included in the screen even though the Commission recently stated that this spectrum “could potentially enhance competition in the provision of mobile terrestrial wireless services;”¹⁸² and

¹⁷⁸ See T-Mobile at 20-30; RCA at 51-52.

¹⁷⁹ See T-Mobile at 23-24 (seeking to exclude 12.5 MHz of SMR spectrum and 10 MHz of 700 MHz D Block spectrum).

¹⁸⁰ See Press Release, Sprint, Sprint Accelerates Deployment of Network Vision and Announces National Rollout of 4G LTE (Oct. 7, 2011), http://newsroom.sprint.com/article_display.cfm?article_id=2064. Indeed, T-Mobile does not oppose inclusion of the G Block, agreeing that this spectrum “is now licensed and available for broadband use.” T-Mobile at 22-23.

¹⁸¹ See Clearwire Annual Report at 14.

¹⁸² *Fifteenth Report*, 26 FCC Rcd at 9702 ¶ 39; see also *Fixed and Mobile Services in the Mobile Satellite Service Bands*, Notice of Proposed Rulemaking and Notice of Inquiry, 25 FCC Rcd 9481, 9490-91 ¶ 21 (2010). The National Broadband Plan identified 90 MHz of MSS spectrum as usable for terrestrial broadband: 40 MHz in the S-Band, 40 MHz in the L-Band, and 10 MHz in the Big LEO Band. See National Broadband Plan at 87, Exh. 5-G. Even taking into account the International Bureau’s proposal to suspend LightSquared’s ATC authority in the L-Band due to GPS interference concerns, see *International Bureau Invites Comment on NTIA Letter Regarding LightSquared Conditional Waiver*, Public Notice, DA 12-214, at 4 (Feb. 15, 2012), spectrum in the S-Band and Big LEO Band remains suitable for mobile broadband use. For example, DISH Network has filed applications to acquire control of the MSS licenses of DBSD Satellite Services and TerreStar Networks, which hold ATC authority covering a combined 40 MHz of S-Band MSS spectrum. See *DISH Network Corporation Files to Acquire Control of*

- 25 MHz of WCS spectrum, which is not included in the screen even though the Commission recently changed its technical rules to “immediately” make this spectrum available for mobile broadband services.¹⁸³

If, consistent with precedent, the Commission were to assess what other spectrum is “suitable” for the screen, all of this spectrum must be included in the screen.¹⁸⁴ T-Mobile’s objection to considering additional BRS/EBS spectrum and MSS/ATC spectrum as part of the Commission’s competition analysis rings hollow in light of its advocacy last year that all 194 MHz of BRS/EBS spectrum and 90 MHz of MSS/ATC spectrum should be included in the screen.¹⁸⁵ Indeed, as one T-Mobile executive explained in response to a national competitor challenging its transaction, “the fact that a major wireless competitor is making these arguments should give regulators pause.”¹⁸⁶

Licenses and Authorizations Held By New DBSD Satellite Services G.P. and TerreStar License Inc., Public Notice, 26 FCC Rcd 13018 (2011). DISH plans to launch a hybrid satellite and terrestrial mobile and fixed broadband network pending FCC action on the applications. See Mike Farrell, *Ergen: Dish Has 80% Chance of Wireless Success*, MULTICHANNEL NEWS, Feb. 23, 2012, <http://www.multichannel.com/article/480899-Ergen-Dish-Has-80-Chance-of-Wireless-Success.php>.

¹⁸³ See FCC News Release, *FCC Unleashes 25 MHz of Spectrum for Mobile Broadband Use* (May 20, 2010), at 1, http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-298308A1.pdf; see also *Amendment of Part 27 of the Commission’s Rules to Govern the Operation of Wireless Services in the 2.3 GHz Band*, Report and Order and Second Report and Order, 25 FCC Rcd 11710, 11711 ¶ 1 (2010) (“2010 WCS Order”).

¹⁸⁴ The Commission considers spectrum to be a relevant input for inclusion in the spectrum screen if it is fairly certain to be “suitable” to be used in the near term to provide mobile telephony and mobile broadband services. See *AT&T-Qualcomm Order* at ¶¶ 38-39 & n.117.

¹⁸⁵ Compare T-Mobile at 24-28 with Joint Opposition of AT&T Inc., Deutsche Telekom AG, and T-Mobile USA, Inc. to Petitions to Deny and Reply to Comments, WT Docket No. 11-65, at 186 (filed June 10, 2011) (“In particular, the Commission should now include the 90 MHz of MSS/ATC spectrum and all 194 MHz of BRS/EBS spectrum, not just the 55.5 MHz it has considered before, because that spectrum is now available – or will soon be available – for the deployment of commercial mobile wireless services.”).

¹⁸⁶ Tom Sugrue, *Life (and Merger Review) Imitates Baseball*, T-MOBILE ISSUES & INSIGHTS BLOG (Aug. 8, 2011), <http://blog.t-mobile.com/2011/08/08/life-and-merger-review-imitates-baseball>.

Efforts to modify the spectrum screen trigger downwards are equally divorced from reality.¹⁸⁷ No credible analysis is provided as to how the current trigger of one-third of available spectrum is inadequate, or why any change is necessary to maintain robust competition.¹⁸⁸ The focus of the trigger should be on the total amount of spectrum available *to other competitors*, not how much an individual carrier holds in any given market. It is well established that providers may have significantly different spectrum needs while competing successfully, as the Commission has found that “many carriers are competing successfully with far lower amounts of bandwidth today.”¹⁸⁹

Suggestions that the Commission radically contort the screen to achieve commenters’ desired outcomes also should be rejected. These unwarranted and complex schemes to develop a weighted value of spectrum – whether based on spectrum characteristics, auction prices, book value, or other metrics purportedly designed to capture the value of different spectrum bands¹⁹⁰ – are far outside the proper bounds of this proceeding. Again, allegations of speculative harm in the absence of specific facts are woefully insufficient to justify a radical overhaul of the screen.¹⁹¹

¹⁸⁷ RCA at 52-53. The further suggestion that the trigger should only be altered for some carriers lacks any intellectual rigor as to why the Commission’s screen should treat two providers differently than all other potential licensees. *Id.*

¹⁸⁸ Katz Declaration at ¶¶ 61-62.

¹⁸⁹ *AT&T Wireless-Cingular Order*, 19 FCC Rcd at 21568-69 ¶ 109.

¹⁹⁰ See T-Mobile at 30-34; Free Press at 9-19; Public Knowledge at 47; RCA at 47-49; Sprint Nextel at 18-20.

¹⁹¹ See *AT&T Mobility-BTA Ventures Order* at ¶¶ 6-7; *New Cingular-D&E Investments Order* at ¶¶ 6-7; cf. *AT&T-Qualcomm Order* at ¶ 41.

In any event, any approach that attempts to weigh spectrum based on technical “value” is fundamentally unworkable.¹⁹² Different bands have different characteristics that can make them more or less attractive to a given carrier at a given time depending on many factors. For example, as the Commission has stated, “higher-frequency spectrum may be just as effective, or more effective, for providing significant capacity, or increasing capacity, within smaller geographic areas.”¹⁹³ Indeed, carriers that rely heavily or exclusively on spectrum over 1 GHz have emphasized the capacity benefits of higher band spectrum.¹⁹⁴ These capacity benefits are also attributable to the larger blocks of contiguous spectrum available in the higher bands,¹⁹⁵ and some radio systems “may perform better at higher frequencies.”¹⁹⁶ Dr. Katz explains that

¹⁹² Katz Declaration at ¶¶ 64-77.

¹⁹³ *Fifteenth Report*, 26 FCC Rcd at 9836 ¶ 296; *see also id.* at 9837 ¶ 296 (“[H]igher frequency spectrum can be ideally suited for providing high capacity where it is needed....”).

¹⁹⁴ In 2010, T-Mobile stated that “[t]here are certain circumstances where upper band spectrum is as effective as, *or preferred to*, lower band spectrum in providing competitive services, *particularly for enhancing capacity* in highly populated areas.” *Ex Parte* Notice from Russell H. Fox, Counsel for T-Mobile USA, Inc., to Marlene H. Dortch, Secretary, FCC, WT Docket No. 10-133 *et al.*, at 2 (filed Dec. 2, 2010) (emphasis added). When touting its spectrum position to investors, Barry West, Sprint Nextel’s former Chief Technology Officer explained that “the 2.5 gigahertz band spectrum Sprint Nextel’s WiMAX network will use *compares favorably to 700 megahertz band spectrum*. While the lower band enables coverage to be deployed more cheaply initially, *the upper band allows greater overall capacity to handle more subscribers*.” *See* Paul Kirby, *Sprint Nextel CTO Offers Vigorous Defense of WiMAX*, TR DAILY, Apr. 22, 2008 (emphasis added).

¹⁹⁵ *See Fifteenth Report*, 26 FCC Rcd at 9836-37 ¶ 296; *see also* Clearwire Annual Report at 14 (“Our deep spectrum position [160 MHz] in most of our markets enables us to offer our subscribers significant mobile data bandwidth, with potentially higher capacity than is currently available from other carriers.”); John Saw, Clearwire, FCC National Broadband Plan Workshop, Spectrum, Tr. 35:19-21, 36:15-17 (Sep. 17, 2009) (testifying that “[y]ou’re looking at 120 megahertz ... of spectrum to really deliver true broadband services” and “you also need to have contiguous blocks of spectrum to really be able to deliver the true ... broadband experience”), http://www.broadband.gov/docs/ws_25_spectrum.pdf.

¹⁹⁶ *Fifteenth Report*, 26 FCC Rcd at 9836 ¶ 296.

commenters fail “to recognize that the production of wireless service requires a mix of inputs.”¹⁹⁷

Auction prices, similarly, should not be the basis for weighing spectrum in the context of the screen. Auction prices reflect the value of spectrum at a particular point in time and will vary as the market varies. Moreover, prices paid at auction are driven by a number of other factors at a given time, often unrelated to spectrum’s technical characteristics.¹⁹⁸ As Verizon Wireless has previously demonstrated, if auction prices are considered in the context of all major mobile wireless spectrums auctions since 1995 and prices are adjusted for inflation, no price trends between spectrum above and below 1 GHz are discernible.¹⁹⁹ For example, there are numerous reasons why AWS spectrum sold for less in Auction 66 than 700 MHz spectrum in Auction 73, including: supply (the AWS auction had significantly more spectrum, which likely would decrease demand and thus yield lower prices per MHz-POP); encumbrances (AWS required significant band clearing of federal government use); and economic and market conditions (exploding growth in data and broadband use between the 2006 AWS auction and the 2008 700 MHz auction, which substantially increased spectrum demand by 2008). Dr. Katz concludes, “economic analysis clearly indicate that prices or book values are an extremely poor indexes of competitive implications.”²⁰⁰

¹⁹⁷ Katz Declaration at ¶ 69.

¹⁹⁸ *See, e.g.*, Free Press at 14-15 (“Spectrum valuations can vary within a specific spectrum band, and even within a spectrum block, as local markets have varying population density and customer demographics. Further, a specific carrier may place a higher valuation on any given block due to their own existing spectrum position, or their perceptions of their future position relative to competitors. And prices paid for specific blocks at auction may be heavily influenced by the geographic size of the block itself and the inflation (or deflation) caused by the presence of (or lack of) non-national carriers bidding for these specific blocks.”).

¹⁹⁹ *See* Verizon Wireless 2011 Competition Comments at 133-35.

²⁰⁰ Katz Declaration at ¶ 68.

While Sprint Nextel suggests reliance on book values, it acknowledges “the inherent limitations associated with spectrum book values, which reflect only each carrier’s self-assessment of the value of its spectrum holdings in a given period of time. Fluctuations in spectrum book values arising from marketplace events and technological developments also may reduce the continuing utility of specific valuations.”²⁰¹ The Commission cannot establish a screening mechanism that relies upon subjective and variable decisions of individual carriers: Any such approach would invite gamesmanship and abuse by parties trying to manipulate the Commission’s review. In light of the foregoing, consideration of any value-weighted spectrum screen or other radical adjustment to the screen is not appropriate for consideration at all, much less in the context of these proceedings.

A Spectrum Test Focused on a 4G LTE Submarket Is Ill-Conceived. Nor is there any basis for the Commission to assess Verizon Wireless’ post-transaction spectrum holdings on the basis of a new 4G LTE spectrum submarket consisting of spectrum in the AWS and 700 MHz bands. RCA simply ignores the 4G LTE services that are, or will soon be, provided in bands other than 700 MHz or AWS.²⁰² For example, MetroPCS is deploying 4G LTE “on our AWS and PCS spectrum,”²⁰³ and Sprint Nextel is deploying 4G LTE “in the G-Block of the 1900 MHz band, where [it] has a nationwide 5x5 MHz block of spectrum.”²⁰⁴ Indeed, Sprint Nextel plans an aggressive 4G LTE deployment, with the goal of covering 123 million POPs by the end of

²⁰¹ See Sprint Nextel at 18 n.45.

²⁰² RCA at 14-15.

²⁰³ METROPCS, ANNUAL REPORT 2010 at 43 (2010), <http://phx.corporate-ir.net/External.File?item=UGFyZW50SUQ9OTAxNjZ8Q2hpbGRJRD0tMXxUeXBIPtM=&t=1>.

²⁰⁴ Phil Goldstein, *Sprint to launch LTE on 1900 MHz spectrum by mid-2012*, FIERCEWIRELESS, Oct. 7, 2011, <http://www.fiercewireless.com/story/sprint-launch-lte-1900-mhz-spectrum-mid-2012/2011-10-07>.

this year and 250 million by the end of 2013.²⁰⁵ Sprint Nextel also plans to deploy 4G LTE on its 800 MHz spectrum by the first half of 2013.²⁰⁶ In addition, Clearwire plans to begin building a high capacity LTE network in early 2012 using its BRS/EBS spectrum, which already carries 4G WiMAX service covering approximately 131.9 million people as of December 31, 2011.²⁰⁷ These deployments discredit any suggestion that there is any distinct “4G LTE” spectrum market consisting only of 700 MHz and AWS spectrum.

Moreover, 4G LTE is not limited to use in the bands identified above. Standards setting bodies have established twenty-three bands within which LTE is “designed to operate.”²⁰⁸ The LTE Release 10 standard (“LTE Advanced”) adds eleven more bands, for a total of thirty-four bands within which the standard is designed to operate, including the MSS S-Band and L-Band and the WCS band.²⁰⁹ These standards demonstrate that 4G LTE will operate across a large range of bands, and is capable of expanding to an even broader range of bands. And, of course, other 4G technologies such as WiMAX also can be provided across many bands.

Finally, the United States has refrained from imposing technology requirements on any particular bands. Rather, the Commission’s long-standing policy is to “maintain[] technical and

²⁰⁵ Karl Bode, *Sprint: LTE Advanced on 1900 MHz PCS Spectrum*, DSL REPORTS, Oct. 25, 2011, <http://www.dslreports.com/shownews/Sprint-LTE-Advanced-on-1900MHz-PCS-Spectrum-116758>.

²⁰⁶ Sue Marek, *Sprint will deploy LTE-Advanced in the first half of 2013*, FIERCEWIRELESS, Oct. 25, 2011, <http://www.fiercewireless.com/story/sprint-will-deploy-lte-advanced-first-half-2013/2011-10-25>.

²⁰⁷ See Clearwire Annual Report, at 9, 14.

²⁰⁸ See 3GPP TS 36.101 version 8.16.0, at Table 5.5-1 (Dec. 2011) (“4G LTE Rel. 8 Standard”), <http://webapp.etsi.org/key/queryform.asp>.

²⁰⁹ See 3GPP TS 36.101 version 10.5.0 at Table 5.5-1 (Jan. 2012) (“4G LTE Rel. 10 Standard”), <http://webapp.etsi.org/key/queryform.asp>.

service neutrality in its rules and allow[] flexible spectrum use by licensees.”²¹⁰ A decision to limit a 4G LTE spectrum market assessment to certain bands would ignore this core flexibility at the heart of U.S. spectrum policy and undermine the dynamic nature of mobile broadband services.²¹¹

E. Claims Suggesting that Alternative Buyers Would Better Serve the Public Interest Must Be Rejected.

Underlying many of the claims about “aggregation” is the implication that the Commission should await a different buyer, or find another use of the spectrum, rather than review and approve these transactions.²¹² These claims ignore Section 310(d)’s direction that the Commission’s review is confined to the transaction before it rather than the relative merit of any hypothetical alternative transactions or use of the spectrum.²¹³ The Commission has acknowledged that “Section 310(d) of the Act limits our consideration to the buyer proposed in an assignment application, and we cannot consider whether some other proposal might

²¹⁰ *2010 WCS Order*, 25 FCC Rcd at 11723 ¶ 28.

²¹¹ *Cf.* International Telecommunications Union, ICT Regulation Toolkit 4.3.2 Spectrum (last updated Feb. 2, 2012), <http://www.ictregulationtoolkit.org/en/section.2094.html> (noting that “regulators are starting to grant the right to use spectrum without regard to the type of technology” and that the “United States ... generally takes a technology-neutral approach”); *see also* 47 U.S.C. § 303 (providing the FCC with authority to allocate spectrum “so as to provide flexibility of use”).

²¹² *See, e.g.*, NTCH at 5; New Jersey Division of Rate Counsel at 20-21; T-Mobile at 4-5, 16, 35; *see also* Free Press at 27. T-Mobile – which has its own billion dollar spectrum acquisition pending before the Commission – self-servingly implies it might have been interested if not for its ill-fated merger. *See* T-Mobile at 15. Yet, the Commission’s role is not to save T-Mobile from its business decisions by engineering transactions more to T-Mobile’s liking.

²¹³ 47 U.S.C. § 310(d). The House Report issued in connection with the amendments that added the current version of Section 310(d) stated that the amendments were intended to ensure that the Commission undertook its review “as though no other person were interested in securing [the] permit or license.” H.R. Rep. No. 82-1750 at 12 (1952), *reprinted at* 1952 U.S.C.C.A.N. 2234, 2246.

comparatively better serve the public interest.”²¹⁴ The “fundamental purpose” of this provision is to “avoid ‘an unwise invasion by a governmental agency into private business practice ... and undue delay in passing upon transfers of licenses.’”²¹⁵

F. The Remaining Issues Raised by Commenters Are Not Specific to the License Assignments Under Review and Should Be Rejected.

Commenters set forth a laundry list of additional matters that they urge the Commission to consider in this proceeding. None of these issues is specific to the transactions under review, and many have either been addressed or are currently under consideration in ongoing, industry-wide dockets. The Commission does not address or weigh alleged harms in the context of a transaction unless they are “transaction-specific” – *i.e.*, unless they directly “arise from the transaction.”²¹⁶ The Commission “will not impose conditions to remedy pre-existing harms or harms that are unrelated to the transaction”²¹⁷ or “single Applicants out for special treatment unwarranted by any likely adverse consequences of the transaction.”²¹⁸ Further, it does “not consider arguments in [merger] proceeding[s] that are better addressed in other Commission

²¹⁴ See, e.g., *Citadel Communications Co., Ltd. and Act III Broad. of Buffalo, Inc.*, Memorandum Opinion and Order, 5 FCC Rcd 3842, 3844 ¶ 16 (1990).

²¹⁵ See *MMM Holdings, Inc. and LIN Broadcasting Corp.*, Memorandum Opinion and Order, 4 FCC Rcd 6838, 6839 ¶ 8 (CCB/MMB 1989), *aff’d*, 4 FCC Rcd 8243, 8244 ¶¶ 8-9 (1989) (quoting S. Rep. No. 44, 82d Cong., 1st Sess. 8, 8 (1951)); *Pinelands, Inc. and BHC Communications, Inc.*, Memorandum Opinion and Order, 7 FCC Rcd 6058, 6062 ¶ 14 (1992).

²¹⁶ See, e.g., *Verizon Communications Inc. and MCI, Inc.*, Memorandum Opinion and Order, 20 FCC Rcd 18433, 18446 ¶ 19 (2005) (“*Verizon-MCI Order*”); *IT&E Overseas, Inc. and PTI Pacifica Inc.*, Memorandum Opinion and Order and Declaratory Ruling, 24 FCC Rcd 5466, 5474 ¶ 14 (2009); *Time Warner Inc. and Time Warner Cable Inc.*, Memorandum Opinion and Order, 24 FCC Rcd 879, 887 ¶ 13 (MB/WCB/IB 2009) (“*Time Warner Order*”); *SBC Communications Inc. and AT&T Corp.*, Memorandum Opinion and Order, 20 FCC Rcd 18290, 18303 ¶ 20 (2005) (“*SBC-AT&T Order*”).

²¹⁷ See, e.g., *AT&T-Qualcomm Order* at ¶ 79; *AT&T-Centennial Order*, 24 FCC Rcd at 13929 ¶ 30; *Sprint Nextel-Clearwire Order*, 23 FCC Rcd at 17581-82 ¶ 22.

²¹⁸ *GM-Hughes Order*, 19 FCC Rcd at 534 ¶ 131; see also *Verizon-MCI Order*, 20 FCC Rcd at 18445 ¶ 19; *SBC-AT&T Order*, 20 FCC Rcd at 18302-03 ¶ 19.

proceedings,”²¹⁹ as “perceived imbalances in the industry” are “best left to broader industry-wide proceedings.”²²⁰ Accordingly, the sundry objections raised by commenters must be rejected.

Roaming. Commenters fail to demonstrate how the spectrum acquisition will impact roaming in any way.²²¹ Nor could they. Because SpectrumCo and Cox have not been operating networks or providing roaming to other carriers, Verizon Wireless' acquisition of spectrum from these entities will not result in any diminution in the number of service providers offering roaming, and therefore will have no competitive impact on the availability of any roaming services. And, several regional carriers have publicly touted their nationwide coverage obtained through roaming agreements.²²² In any case, the Commission has addressed these issues comprehensively.²²³ To the extent commenters are dissatisfied with the negotiation process or

²¹⁹ See, e.g., *Craig O. McCaw and AT&T Co.*, Memorandum Opinion and Order, 9 FCC Rcd 5836, 5904 ¶ 123 (1994) (“*McCaw-AT&T Order*”); see also *AT&T-Centennial Order*, 24 FCC Rcd at 13969 ¶ 133 (stating that general concerns regarding roaming would be more appropriately addressed in the relevant proceeding); *AT&T-Verizon Wireless Order*, 25 FCC Rcd at 8748, ¶ 101 (same).

²²⁰ *GM-Hughes Order*, 19 FCC Rcd at 534 ¶ 131.

²²¹ See NTCH at 6-7; Public Knowledge at 48; RCA at 35, 56.

²²² See, e.g., MetroPCS Communications Inc., Form 10-Q (Third Quarter 2011 Earnings Report) at 23 (filed Nov. 1, 2011) (discussing service plans “offering nationwide voice, text messaging and web browsing services on an unlimited basis beginning at \$40 per month”), <http://phx.corporate-ir.net/External.File?item=UGFyZW50SUQ9NDUwMTgyfENoaWxkSUQ9NDc0ODc0fFR5cGU9MQ==&t=1>; Leap Wireless International, Inc., Form 10-Q (Third Quarter 2011 Earnings Report) at 4 (filed Nov. 3, 2011) (touting “unlimited nationwide wireless services”), <http://services.corporate-ir.net/SEC/Document.Service?id=P3Vybd1odHRwOi8vaXIuaW50Lndlc3RsYXdidXNpbmVzcy5jb20vZG9jdW1lbnQvdjEvMDAwMTA2NTA0OS0xMS0wMDAwMDkvZG9jL0x1YXBXaXJlbGVzc0ludGVybmdF0aW9uYWxfMTBRXzIwMTEuMTAzLnBkZiZ0eXB1PTImZm49TG9hZFdpcmVsZXNzSW50ZXJuYXRpb25hbF8xMFFfMjAxMTExMDMucGRm>.

²²³ See *Reexamination of Roaming Obligations of Commercial Mobile Radio Service Providers*, Second Report and Order, 26 FCC Rcd 5411 (2011) (“*Data Roaming Order*”), recon. pending, appeal pending.

the terms and conditions for roaming, they may file a complaint with the Commission.²²⁴ There is no basis for imposing conditions here to address an alleged “harm” that is not specific to the instant transactions.

Interoperability. There is no basis to impose conditions relating to device interoperability in the Lower 700 MHz spectrum band.²²⁵ When commenters sought similar conditions as part of the AT&T-Qualcomm spectrum transaction, the Commission declined:

We do not believe ... that it is appropriate to address as part of this transaction the various interoperability obligations requested by several parties as possible conditions. Even if we assume that the lack of Lower 700 MHz interoperability causes significant competitive harm, such harm already existed independent of the license transfer applications before us. We believe the better course would be to consider the numerous technical issues raised by the lack of interoperability through a rulemaking proceeding, and we plan to begin such a proceeding in the first quarter of next year.²²⁶

This holding is particularly apt for these transactions, which – unlike AT&T-Qualcomm – do not involve *any* licenses in the lower 700 MHz band.

Buildout or Use It Conditions. The spectrum at issue here is already subject to AWS substantial service requirements, and no party attempts to demonstrate that either SpectrumCo or Cox has not complied with those requirements.²²⁷ Commenters that assert these requirements are inadequate or seek to impose novel “use it or share it” concepts essentially criticize existing Commission build-out rules.²²⁸ They can seek modifications in an industry-wide rulemaking –

²²⁴ *Data Roaming Order*, 26 FCC Rcd at 5448-5453 ¶¶ 74-87.

²²⁵ *See* NTCH at 8-9; RCA at 57-58.

²²⁶ *AT&T-Qualcomm Order* at ¶ 71.

²²⁷ *See supra* Section I.E.3.

²²⁸ *See* Public Knowledge at 49-52.

but not here.²²⁹ The request by one commenter to impose buildout obligations on Verizon Wireless’ Lower 700 MHz spectrum holdings – spectrum that is not even part of these transactions – should be summarily rejected.²³⁰ To the extent there is any “harm” alleged here, it is surely not specific to the license assignments, given that the AWS licenses are currently not being used to provide service to customers. If anything, the license assignments will speed the use of the spectrum at issue.

Backhaul. Commenters request conditions on Verizon Wireless related to backhaul,²³¹ but as with interoperability, access to backhaul facilities is an issue of industry-wide relevance that is the subject of a pending rulemaking proceeding, and is not related to any transaction-specific harm, as the Commission held in the *AT&T-Qualcomm Order*.²³² Moreover, commenters’ arguments address the alleged consequences of the Commercial Agreements, not the proposed spectrum license assignments, and are therefore not appropriate in this Section 310(d) review. In any event, the marketplace for high-capacity services is marked by growth, competition, diverse suppliers and service offerings, and continuous innovation.²³³ To the extent commenters disagree, the proper forum for their arguments is the Commission’s open rulemaking, not these transactions.

Open Internet. Open Internet issues are matters of industry-wide relevance, and there is no basis to subject Verizon Wireless to any Open Internet-related conditions.²³⁴ Such conditions

²²⁹ See *id.*; NTCH at 5.

²³⁰ See RCA at 57-58.

²³¹ See NTCH at 12-13; RCA at 58.

²³² *AT&T-Qualcomm Order* at ¶¶ 77-79.

²³³ See, e.g., Verizon Wireless 2011 Competition Comments at 99-107 (and sources cited therein).

²³⁴ New Jersey Division of Rate Counsel at 37, 39.

would bear no relationship whatsoever to the license assignment under review, as the Commission held in the *AT&T-Qualcomm Order*.²³⁵ Moreover, to the extent parties disagreed with the Commission’s rulemaking findings, the proper course of action was to seek reconsideration or judicial review.

Handset Exclusivity. In the *AT&T-Qualcomm Order*, the Commission included handset exclusivity among the set of issues not appropriately addressed in a spectrum acquisition proceeding.²³⁶ Moreover, handset exclusivity claims are the subject of a separate request for rulemaking,²³⁷ and parties fail to provide any basis for concluding that these transactions impact handset exclusivity. In fact, commenters offer no new information, facts, or data that have not already been raised in that rulemaking proceeding.²³⁸

Resale. As described below, Section 310(d) authorizes the Commission to evaluate harms allegedly arising from the spectrum license assignments at issue – not harms alleged to arise from the Commercial Agreements.²³⁹ In any case, the industry is replete with joint marketing agreements and other joint ventures, which afford reciprocal benefits to the participants and create benefits for consumers. Requests for government-supervised resale and associated claims of harm arising from the Commercial Agreements are therefore both irrelevant and not appropriately addressed here.

²³⁵ See *AT&T-Qualcomm Order* at ¶¶ 77-79.

²³⁶ See *AT&T-Qualcomm Order* at ¶¶ 75, 79.

²³⁷ See Rural Cellular Association, Petition for Rulemaking Regarding Exclusivity Arrangements Between Commercial Wireless Carriers and Handset Manufacturers, RM-11497 (filed May 20, 2008).

²³⁸ See NTCH at 9-10; Public Knowledge at 53.

²³⁹ See Comments of Communications Workers of America and the International Brotherhood of Electrical Workers (“CWA”) at 25; RCA at 56-57; NTCH at 11-12.

Billing Practices. The Commission should deny a petition which seeks to challenge Verizon Wireless’ basic qualifications due to a matter relating to Verizon Wireless’s billing practices.²⁴⁰ The Enforcement Bureau thoroughly investigated this same matter and, in adopting a Consent Decree, “conclude[d] ... [that it] raises no substantial or material questions of fact as to whether Verizon Wireless possesses the basic qualifications, including those related to character, to hold or obtain any Commission license or authorization.”²⁴¹ That conclusion became final more than a year ago,²⁴² and there is no basis to revisit it here.

Discounted Broadband Services. The Commission should reject a request to require Verizon – not Verizon Wireless – to implement a program under which income-eligible families may obtain discounted broadband services and computers.²⁴³ This request on its face is irrelevant to the proposed spectrum transfer as it does not even relate to Verizon Wireless, much less the spectrum the parties are proposing to transfer. Regardless, both Verizon and Verizon Wireless already offer all consumers a wide range of affordable services and devices, including multiple 4G and 3G smartphones, basic phones, USB modems, and mobile hotspots.

²⁴⁰ Petition to Deny of Diogenes Telecommunications Project (“DTP”) at 27-28.

²⁴¹ *Verizon Wireless, Data Usage Charges*, Order, 25 FCC Rcd 15105 ¶ 4 (EB 2010); *see also Verizon Wireless, Data Usage Charges*, Consent Decree, 25 FCC Rcd 15107 (EB 2010).

²⁴² *See* 47 C.F.R. §§ 1.106(f), 1.115(d), 1.117(a).

²⁴³ New Jersey Division of Rate Counsel at 38-39.

III. THE COMMISSION DOES NOT REVIEW AGREEMENTS THAT DO NOT INCLUDE LICENSE TRANSFERS, AND IN ANY EVENT THE COMMERCIAL AGREEMENTS ARE BEING REVIEWED BY THE DEPARTMENT OF JUSTICE.

Commenters argue that the Commission must review and approve the separate Commercial Agreements that Verizon Wireless has entered into with the owners of SpectrumCo and Cox, respectively.²⁴⁴ The Commission should reject these arguments.

Consideration of the Commercial Agreements is not necessary for – or even relevant to – the review of the spectrum license assignments here. The license assignments and Commercial Agreements are separate from, and not contingent on, each other. The Commercial Agreements do not effectuate license assignments or a change in ownership or control of a licensee or common carrier Section 214 authorization, and only such actions require advance Commission review and approval.²⁴⁵

That these agreements are not subject to Commission review in this Section 310(d) proceeding is evident from their purpose and scope:

- First, the parties entered into a series of agreements where they will act as agents selling one another’s services (“Agent Agreements”). But because sales agreements of this type do not involve a change in license ownership or control, the FCC has never reviewed them. Indeed, Verizon Wireless alone has numerous agreements under which other entities act as its agent selling its services, as do other providers throughout the industry. The Commission did not subject these agreements to review and approval, nor could it have done so under the Act.
- Second, the parties entered into agreements in which the cable companies have the option, after approximately four years, to become resellers of Verizon Wireless’ services (“Reseller Agreements”). But these agreements, which only establish a future option, likewise do not involve any change in ownership or control. Again,

²⁴⁴ See, e.g., CWA at 5; Comments of DIRECTV, LLC (“DIRECTV”) at 2, 5; Free Press at 40; Comments of Greenlining Institute (“Greenlining Institute”) at 1-5; Petition to Deny of Hawaiian Telecom Communications, Inc. Petition to Deny (“Hawaiian Telecom”) at 9-10; New Jersey Division of Rate Counsel at 23; NTCH at 10, 12; Public Knowledge at 17-21; RCA at 37-40; RTG at 4; Sprint Nextel at 2; T-Mobile at 7, 18-20.

²⁴⁵ 47 U.S.C. §§ 214, 310(d).

both Verizon Wireless and many other providers have numerous agreements that were not subject to Commission review that allow others to resell their services.

- Third, the parties agreed to establish a joint venture to develop innovative ways to integrate wireline and wireless services so that consumers can seamlessly use their services across a variety of devices and screens (“Innovation Technology Joint Venture”). But the creation of the joint venture does not involve any interest in any FCC licenses. Therefore, it does not trigger any Commission review.

A. The Commission Has Consistently Declined to Review Business Agreements Not Involving Transfers of Commission Authorizations.

Long-standing precedent has established that Section 310(d) – the provision of the Act applying to these license assignments – calls for review of a license assignment itself, not of any other transactions, even when those transactions involve the same parties. The Supreme Court, considering a predecessor to Section 310(d), addressed whether a private contract repudiated at the Commission’s direction as a precondition to a radio license renewal could nevertheless be given effect by a state court.²⁴⁶ The Commission had determined that the contract between the licensee and another party did not serve the public interest because it drained needed resources from the licensee, and agreed to renew the license only subject to the licensee’s representation that it would repudiate the contract. The Court held that the licensee’s subsequent repudiation

²⁴⁶ See *Regents of the University System of Georgia v. Carroll*, 338 U.S. 586 (1950). The provision under review was the 1934 Act’s original Section 310(b). The 1934 provision read as follows: “The station license required hereby, the frequencies authorized to be used by the licensee, and the rights therein granted shall not be transferred, assigned, or in any manner either voluntarily or involuntarily disposed of, or indirectly by transfer of control of any corporation holding such license, to any person, unless the Commission shall, after securing full information, decide that said transfer is in the public interest, and shall give its consent in writing.” Communications Act of 1934, ch. 652, Part I, § 310(b) (replaced by 66 Stat. 716 (1952)). This version of the provision remained in place until 1952, when Congress adopted the version that stands today and codified it as Section 310(d). See 66 Stat. 716 (1952). The 1952 amendment did nothing to expand the Commission’s authority in this area.

was without legal effect, because “[w]e do not read the Communications Act to give authority to the Commission to determine the validity of contracts between licensees and others.”²⁴⁷

In fact, in cases where the Commission has been asked to review commercial agreements involving the parties to a transaction that, unlike here, were *directly* related to or even dependent on a spectrum transaction, it declined to do so. The Commission followed this policy for the AT&T-Centennial transaction,²⁴⁸ the GM-Hughes transaction,²⁴⁹ and the Sprint Nextel-Clearwire transaction.²⁵⁰ In addition, it did not review joint marketing agreements and other business arrangements closely akin to those at issue here. In 2005, Sprint Nextel, Comcast, Time Warner

²⁴⁷ See *id.* at 587-91, 602.

²⁴⁸ Cellular South argued that AT&T’s acquisition of a controlling interest in one of Centennial’s licenses would violate a Commission-approved settlement agreement between BellSouth and Cellular Holding, Inc. Although the settlement agreement directly addressed ownership issues relating to the transfer, the Commission refused to review it: “[W]e agree with the Applicants that the Agreement constitutes a private contractual matter between New Cingular Wireless and Cellular South that is beyond the Commission’s jurisdiction.” *AT&T-Centennial Order*, 24 FCC Rcd at 13976 ¶ 152.

²⁴⁹ In that proceeding, a party petitioned to challenge the allegedly inequitable treatment of a particular class of shareholders in the underlying deal. While the charge spoke directly to the underlying transfer, the Commission again declined to consider these arguments. *GM-Hughes Order*, 19 FCC Rcd at 609 ¶ 314.

²⁵⁰ In that transaction, the Public Interest Spectrum Coalition asked the Commission to impose a condition that any changes in “contracts with entities providing financial backing that would substantially change the [applicants’] open network commitments must be submitted to the Commission,” placed on public notice, and subject to comment. The Commission declined, even though the request was designed to ensure compliance with merger-related commitments, noting the absence of “any precedent” for Commission review of such private contracts. *Sprint Nextel-Clearwire Order*, 23 FCC Rcd at 17609-10 ¶¶ 98, 101. Nor did the Commission address, much less specifically approve, other aspects of the broader relationships among Sprint, Clearwire, and its other partners that were separate from the license transfers. See, e.g., Press Release, Clearwire, Sprint and Clearwire to combine WiMAX businesses, creating a new mobile broadband company (May 7, 2008), http://corporate.clearwire.com/common/download/download.cfm?CompanyID=CLWR&FileID=442757&FileKey=0556727d-310e-4cae-abf5-48824fdd8098&FileName=CLWR_News_2008_5_7_General_Releases.pdf.

Cable, Cox, and Advance/Newhouse created Pivot Wireless, a \$200 million joint venture aimed at offering wireless services alongside cable television, broadband, and voice services.²⁵¹

Nor has the Commission reviewed any of the dozens of agreements in which direct broadcast satellite (“DBS”) providers DISH Network and DIRECTV have partnered with traditional telephone providers to offer a bundle that combines their satellite TV service with the telephone company’s Internet and voice services.²⁵² Likewise, it has not reviewed various commercial arrangements under which satellite broadband providers and DBS providers supply a bundled satellite television/Internet access offering – including, for example, the recently announced DISH/ViaSat deal²⁵³ – or deals between wireless providers and LECs to offer bundled voice/video/data/mobility.²⁵⁴ Going back almost a decade, there are numerous examples of communications industry joint marketing agreements – none of which faced Commission scrutiny.²⁵⁵

²⁵¹ See Press Release, Sprint Nextel, Comcast, Time Warner Cable, Cox Communications and Advance/Newhouse Communications to Form Landmark Cable and Wireless Joint Venture (Nov. 2, 2005), <http://www.comcast.com/about/pressrelease/pressreleasedetail.ashx?SCRedirect=true&PRID=111>.

²⁵² See, e.g., Press Release, DIRECTV, AT&T and DIRECTV, Inc. Reach Agreement to Offer Satellite TV Service to AT&T Customers (Sept. 26, 2008), <http://www.directv.com/DTVAPP/global/contentPageNR.jsp?assetId=3620013>; Press Release, CenturyLink, DIRECTV and CenturyLink Sign Agreement to Offer Video Services to CenturyLink Customers (Aug. 12, 2010), <http://news.centurylink.com/index.php?s=43&item=57>; Press Release, Frontier Communications, Frontier Communications Chooses DISH Network as its Video Partner (Aug. 3, 2011), http://www.fiercetelecom.com/press_releases/frontier-communications-chooses-dish-network-its-video-partner.

²⁵³ See Press Release, DISH Network, DISH Bundles TV Service with ViaSat’s Next-Generation High-Speed Satellite Broadband (Jan. 9, 2012), <http://press.dishnetwork.com/press-releases/dish-bundles-tv-service-with-viasat-s-next-generat-nasdaq-dish-0838380>.

²⁵⁴ See Press Release, Frontier Communications Corporation, Frontier Communications Teams with AT&T to Offer Wireless Voice and Data Products (Nov. 15, 2011), <http://phx.corporate-ir.net/phoenix.zhtml?c=66508&p=irol-newsArticle&ID=1630726&highlight=>.

²⁵⁵ See Press Release, EchoStar Communications Corp., SBC Communications, EchoStar Reach New Strategic Pact (Sept. 20, 2005) (addressing 2003 agreement extended in 2005),

Even traditional *mergers* involving providers of telecommunications, media, and information-technology offerings remain outside the scope of Commission review when they do not involve assignment of a license or a change in ownership or control of an FCC licensee. The Commission did not, for example, review Microsoft’s 2011 acquisition of Skype,²⁵⁶ the 2007 combination of Dow Jones and News Corp.,²⁵⁷ Google’s 2006 acquisition of YouTube,²⁵⁸ or the 2004 NBC-Vivendi transaction.²⁵⁹

<http://press.dishnetwork.com/Press-Center/News-from-DISH/page/SBC-Communications,-EchoStar-Reach-New-Strategic-P>; Press Release, Qwest Communications, Qwest Forges Agreement With EchoStar To Offer Satellite Services As Part Of Communications Bundle (July 21, 2003), <http://news.centurylink.com/index.php?s=43&item=1003>; SBC / Dish Network Changes Everything (Spring 2004), at 3, http://www.att.com/Common/files/pdf/sbc_dish_mailer.pdf (addressing 2002 agreement).

²⁵⁶ See Press Release, Microsoft Corp., Microsoft to Acquire Skype (May 10, 2011), <http://www.microsoft.com/presspass/press/2011/may11/05-10corpnewspr.mspx>; Press Release, Microsoft Corp., Microsoft Officially Welcomes Skype (Oct. 13, 2011), <http://www.microsoft.com/presspass/press/2011/oct11/10-13SkypePR.mspx>.

²⁵⁷ See Press Release, News Corporation, Dow Jones & Company and News Corporation Enter Into Definitive Merger Agreement (Aug. 1, 2007), http://www.newscorp.com/news/news_347.html. The Commission abstained from reviewing this transaction notwithstanding Commissioner Copps’s call for a “careful factual and legal analysis of the transaction to determine how it impacts specific FCC rules and our overarching statutory obligation.” See, e.g., Letter from Michael J. Copps, Commissioner, Federal Communications Commission, to Kevin J. Martin, Chairman, Federal Communications Commission (Oct. 25, 2007) (“I believe the FCC’s obligation to consider the public interest ... requires us to consider the implications of a merger between these two media giants.”), http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-277576A1.pdf.

²⁵⁸ See Press Release, Google, Inc., Google to Acquire YouTube for \$1.65 Billion in Stock (Oct. 9, 2006), http://www.google.com/press/pressrel/google_youtube.html.

²⁵⁹ See Press Release, NBC, NBC and Vivendi Universal Entertainment Unite to Create NBC Universal (May 12, 2004), http://www.vivendi.com/vivendi/IMG/pdf/14_PR120504NBCU.pdf.

B. The Commission Also Should Not Review the Commercial Agreements Because They Are Being Fully Reviewed by the Department of Justice.

The Commercial Agreements are already the subject of review by the Department of Justice (“DOJ”) Antitrust Division.²⁶⁰ Thus, to the extent any elements of the Commercial Agreements require government review to ensure the ongoing competitiveness of the marketplace, the DOJ is performing that review. Although the authority of the DOJ and FCC overlap with respect to review of the license assignments themselves, only the DOJ has authority to review the Commercial Agreements.

This point is underscored by several commenters who ask the Commission to go far beyond its Section 310(d) authority. T-Mobile couches its argument in terms of alleged violations of the Clayton and Sherman Acts,²⁶¹ which are the foundational antitrust statutes enforced by the DOJ and the FTC. RTG complains that it wants to address “the *antitrust* issues” that are implicated.²⁶² Free Press asserts that the Commercial Agreements violate the DOJ’s Competitor Collaboration Guidelines.²⁶³ CWA/IBEW urge the FCC to collect and review every document that the parties provide to DOJ (where the materials’ confidentiality is strictly protected by Act of Congress).²⁶⁴ These and similar statements reveal that critics are seeking to

²⁶⁰ Consistent with the threshold requirements of the Hart-Scott-Rodino Act (“HSR”), the parties filed notification of the transaction with the antitrust agencies on January 10, 2012. On February 9, 2012, the parties received a request for further information (“Second Request”) from DOJ.

²⁶¹ T-Mobile at 18-19.

²⁶² RTG at 28-31 (emphasis added).

²⁶³ Free Press at 41-47; *see also* DIRECTV at 5 (expressing concerns about “coordinated action [that would] adversely affect competition”); Hawaiian Telecom at 18-19 (arguing that the technology joint venture could allow for “market allocation or another form of anticompetitive conduct”).

²⁶⁴ CWA at 24.

entice the Commission into extending its authority beyond its bounds and duplicating the work of the DOJ.²⁶⁵

In any event, as the parties are demonstrating to the DOJ, the Commercial Agreements are pro-competitive and pro-consumer. The Agent Agreements permit Verizon Wireless, Cox, and the members of SpectrumCo to cross-market each other's offerings, bringing innovative new bundles to consumers, including to the 86 percent of consumers outside the Verizon FiOS footprint. If they are activated, the Reseller Agreements will permit Cox and the SpectrumCo companies to more closely integrate these bundled offerings and offer consumers access to even more choices under separately-branded offerings. The Innovation Technology Joint Venture will allow the Applicants to explore new, consumer-friendly ways to move content from screen to screen, enabling consumers to share and shift content across multiple devices. This work will facilitate the sharing of user-generated content and commercial content alike, improving the end-user experience.²⁶⁶

C. Commenters' Other Proposed Bases for the Commission to Review the Commercial Agreements Are Meritless.

There Is No Violation of Section 652(c). Commenters argue that Section 652(c) of the Act prohibits Verizon Wireless from entering into the Commercial Agreements.²⁶⁷ The Commission's prior decisions, however, make clear that Section 652(c) of the Act does not

²⁶⁵ Public Knowledge *et al.* argue that the Commission's public interest standard allows for the consideration of antitrust policies. *See* Public Knowledge at 19. This assertion is correct as to the actual license assignment applications at issue here. However, the Commission does not have free reign to investigate *any* antitrust concerns, no matter how far removed from the license application at issue.

²⁶⁶ Various commenters claim that the Agreements are not in the public interest. As explained in *Exhibit 6*, these parties entirely ignore the many consumer benefits of the Commercial Agreements, and their allegations that the Agreements will cause competitive harm are wrong.

²⁶⁷ RCA at 40; RTG at 25-26; Public Knowledge at 41-44; Free Press at 41 n.63.

prohibit Verizon Wireless from entering into the Commercial Agreements. Section 652(c) applies to the activities of a “local exchange carrier” (“LEC”).²⁶⁸ The Commission has determined specifically that CMRS providers are not “LECs.”²⁶⁹ Thus, Verizon Wireless is not a LEC, and Section 652(c) is not applicable to it.

Commenters argue that Section 652(c) should be interpreted to include LECs’ affiliates.²⁷⁰ This argument is refuted by the statutory text. While Section 652(a) and (b) expressly refer to a “local exchange carrier *or any affiliate of such carrier*,”²⁷¹ Section 652(c) applies only to a “local exchange carrier” – there is no reference in Section 652(c) to “affiliates.” “[W]here Congress includes particular language in one section of a statute but omits it in another ..., it is generally presumed that Congress acts intentionally and purposely in the disparate inclusion or exclusion.”²⁷² That precept is especially relevant where, as here, the relevant provisions were adopted simultaneously.²⁷³ Thus, Section 652(c) cannot be construed to apply to Verizon Wireless simply because it is an affiliate of Verizon.²⁷⁴

²⁶⁸ *Id.*

²⁶⁹ *See, e.g., Implementation of the Local Competition Provisions of the Telecommunications Act of 1996*, First Report and Order, 11 FCC Rcd 15499, 15996 ¶ 1005 (1996) (concluding that “CMRS providers will not be classified as LECs”).

²⁷⁰ *See* Public Knowledge at 42-44.

²⁷¹ 47 U.S.C. § 572(a), (b).

²⁷² *Keene Corp. v. United States*, 508 U.S. 200, 208 (1993) (quoting *Russello v. United States*, 464 U.S. 16, 23 (1983)).

²⁷³ *See Lindh v. Murphy*, 521 U.S. 320, 330 (1997).

²⁷⁴ *GTE Service Corp. v. FCC*, 224 F.3d 768 (D.C. Cir. 2000), is not relevant here. That case involved a provision (Section 254(g)) whose legislative history made clear that it was intended to be interpreted broadly. Section 652(c) has no such legislative history, and its text expressly excludes affiliates from its reach. In addition, the clarity of Section 652(c) is not affected by questions about the application of Section 652(b) to a cable operator’s acquisition of a competitive local exchange carrier. *See* Petition for Declaratory Ruling to Clarify 47 § U.S.C. 572 in the Context of Transactions between Competitive Local Exchange Carriers and Cable Operators, WC Docket No. 11-118 (filed Jun. 21, 2011).

Other Provisions Cited By Commenters Are Irrelevant. Contrary to the claims of Public Knowledge *et al.*,²⁷⁵ no other statutory provision authorizes the Commission to consider the Commercial Agreements. Sections 624A, 628, or 629²⁷⁶ direct the Commission to adopt rules addressing specific topics,²⁷⁷ and the Commission has in each case done so.²⁷⁸ As an initial matter, these provisions have no obvious relevance to the subject matter here, and commenters' citations to them are ambiguous, far-fetched, and unsupported by any concrete detail or theory. Nevertheless, if commenters believe that the Applicants have violated these rules (and no one has provided a remotely plausible basis for believing that they have), they may allege as much using the mechanisms contemplated by the Act and the Commission's rules. Likewise, if commenters favor adoption of revised rules, they may file petitions for rulemaking. These provisions do not, however, authorize the Commission to review the Commercial Agreements in the context of a license transfer proceeding.

Similarly, nothing in the Commercial Agreements implicates Section 706 of the 1996 Act.²⁷⁹ The provision cited by Public Knowledge – Section 706(b) – directs the Commission “take immediate action to accelerate deployment of [advanced telecommunications] capability by removing barriers to infrastructure investment and by promoting competition in the telecommunications market” if it finds that such services are not being “deployed to all Americans in a reasonable and timely fashion.”²⁸⁰ The Commercial Agreements do not impede the deployment of advanced services – nor does Public Knowledge explain why the provision is

²⁷⁵ See Public Knowledge at 24-29, 36-41.

²⁷⁶ 47 U.S.C. §§ 544a, 548, 549.

²⁷⁷ See *id.* §§544a(b)-(d), 548(c), 549(a).

²⁷⁸ See 47 C.F.R. § 76.630(a); *id.* §§ 76.1000-76.1004; *id.* §§ 76.1200-76.1210.

²⁷⁹ 47 U.S.C. § 1302.

²⁸⁰ *Id.*; see also Public Knowledge at 24.

applicable. To the contrary, the Agent Agreements will give consumers more options for advanced services, the Reseller Agreements have the potential to provide further choices, and the Innovation Technology Joint Venture is intended to develop cross-platform technologies that enhance advanced products and devices available to consumers.

D. Commenters Supply No Justification for Requiring Submission of the Commercial Agreements in Unredacted Format.

Various commenters contend that the Commission must order the Applicants to submit the Commercial Agreements in unredacted format.²⁸¹ As described at length above, the Commission’s review of the spectrum assignments under Section 310(d) does not encompass review of the Commercial Agreements, and to do so would violate longstanding Commission precedent. Moreover, the agreements are already being reviewed by the DOJ. The agreements are unrelated to the license assignments under review here and include highly sensitive commercial information regarding the Applicants and their businesses. Thus, while the Applicants have agreed, at staff’s request, to submit redacted copies under Highly Confidential treatment, there is no reason to require submission of the unredacted documents.²⁸²

²⁸¹ *See, e.g.*, Hawaiian Telecom at 10-13; RTG at 6; Sprint Nextel at 4; CWA at 22-24.

²⁸² *See generally* Letter to Marlene H. Dortch, Secretary, FCC, from Bryan N. Tramont, Counsel for Verizon Wireless, Michael H. Hammer, Counsel for SpectrumCo LLC, and J.G. Harrington, Counsel for Cox TMI Wireless, LLC, WT Docket No. 12-4 (filed Feb. 9, 2012).

CONCLUSION

For the foregoing reasons, commenters have failed to raise any basis for denying the transactions or imposing conditions. Accordingly, the Commission should move swiftly to recognize the public interest benefits associated with the spectrum assignments and unconditionally grant the Applications without conditions.

Respectfully submitted,

/s/

John T. Scott, III
Michael D. Samsok
Katharine R. Saunders
VERIZON
1300 I Street, NW
Suite 400 West
Washington, DC 20005
(202) 589-3760

Michael E. Glover
Of Counsel

Attorneys for Verizon Wireless

Michael H. Hammer
Michael G. Jones
Mia Guizzetti Hayes
Brien C. Bell
WILLKIE FARR & GALLAGHER LLP
1875 K Street, NW
Washington, DC 20006
(202) 303-1000

Attorneys for SpectrumCo

J.G. Harrington
Christina H. Burrow
Michael Pryor
DOW LOHNES PLLC
1200 New Hampshire Avenue, NW
Suite 800
Washington, DC 20036
(202) 776-2000

Attorneys for Cox Wireless

March 2, 2012

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

In re Applications of)	
)	
COX TMI WIRELESS, LLC, Assignor,)	
)	
and)	WT Docket No. 12-4
)	
CELLCO PARTNERSHIP d/b/a VERIZON)	
WIRELESS, Assignee)	
)	
for Consent to the Assignment of)	
Commission Licenses and Authorizations)	
Pursuant to Section 310(d) of the)	
Communications Act)	

DECLARATION OF SUZANNE FENWICK

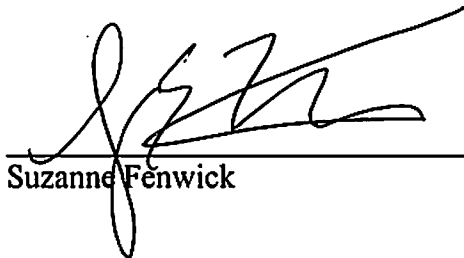
1. My name is Suzanne Fenwick. I am Executive Director for Corporate Development for Cox Communications ("Cox"). My responsibilities include providing leadership and accountability for Cox's acquisition strategy. I have held this position for ten of the past twelve years while employed by Cox. My responsibilities have included strategic review of the company's wireless business and I have been intimately involved in the determination regarding its viability. In making this declaration, I am relying on thorough inquiry and on the kinds of information on which I routinely rely in performing the duties of my office.

2. I am submitting this declaration in support of the Joint Opposition to Petitions to Deny and Comments being filed in this proceeding by Cellco Partnership d/b/a Verizon Wireless, SpectrumCo LLC and Cox TMI Wireless, LLC.

3. I have reviewed the Joint Opposition and, specifically, the factual statements in the Joint Opposition relating to Cox and Cox TMI Wireless. To the best of my knowledge, all of those statements are true and correct.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on March 2, 2011.



Suzanne Fenwick

Declaration of Robert Pick

I, Robert Pick, Chief Executive Officer of SpectrumCo, LLC, hereby declare under penalty of perjury that the facts asserted in the foregoing Joint Opposition To Petitions To Deny And Comments with respect to SpectrumCo, LLC are true and correct, to the best of my knowledge, information, and belief.

A handwritten signature in black ink, appearing to read "Robert Pick", is written over a horizontal line.

Robert Pick
Chief Executive Officer, SpectrumCo, LLC

March 2, 2012

Exhibit 1

Verizon Wireless Spectrum Assignments
to Other Licensees, 2007 - Present

Verizon Wireless Spectrum Assignments to Other Licensees, 2007 – Present

Buyer	Market	Call Sign	Band/Block	Area Assigned	ULS File No.	Close Date
East Kentucky Network d/b/a Appalachian Wireless	Lexington, KY	WQCS428	PCS C	Assignment of Leslie County from 10 MHz license	0002954535	May 2007
Sprint	Rocky Mount, NC	WPTB362	PCS F	Full assignment	0003215270	Apr. 2008
Sprint	Greenville-Washington, NC	WPTB345	PCS F	Full assignment	0003215271	Apr. 2008
Sprint	Roanoke Rapids, NS	WPTB361	PCS F	Full assignment	0003215273	Apr. 2008
Sprint	Greenville-Spartanburg, SC	KNLH211	PCS F	Full assignment	0003215280	Apr. 2008
Sprint	Burlington, NC	WPTB339	PCS F	Full assignment	0003215274	Apr. 2008
Sprint	Jacksonville	KNLF274	PCS B	Assignment of 10 MHz in Bay County in Panama City, FL BTA and 10 MHz in the Valdosta, GA BTA	0003215276 and 0003215278	Apr. 2008
T-Mobile (WALLC deal)	Minneapolis-St. Paul	WPOH983 WPOH998	PCS B	T/C of full (20 MHz) licenses	0003946812	Feb.2010
NEATT	Little Rock, AR	WPOK589 WPTJ401	PCS C	Independence, Jackson and Sharp counties	0003987388	Aug. 2010
NEATT	Little Rock, AR	KNLG223	PCS E	Independence, Jackson and Sharp counties	0003987372	Aug. 2010
NEATT	Poplar Bluff, MO	KNLG336	PCS E	Clay County	50001CWAA10 (paper filed, attached to Step 1 pro forma 0004013632)	Aug. 2010
NEATT	Jonesboro-Paragould, AR	KNLG319	PCS D	Full assignment	0003987374	Aug. 2010
US Cellular	Yakima, WA Anderson, IN Idaho 1	WQJQ736 WQJQ743 WQJQ759	700 MHz B	Full assignment	0004697471	Sept. 2011

Verizon Wireless Spectrum Assignments to Other Licensees, 2007 – Present

Buyer	Market	Call Sign	Band/Block	Area Assigned	ULS File No.	Close Date
US Cellular (cont'd)	Indiana 4 Kansas 8 Nebraska 1 Nebraska 2 Nebraska 7 Nebraska 9 Oklahoma 4 Oregon 3 Washington 5 Washington 8	WQJQ761 WQJQ763 WQJQ774 WQJQ775 WQJQ776 WQJQ777 WQJQ782 WQJQ783 WQJQ795 WQJQ796				
US Cellular	Springfield, IL Champaign, IL Bloomington, IL Illinois 6 Illinois 7	WPWV467 WPWV468 WPWV469 WPWV470 WPWV471	700 MHz Lower C	Full assignment	0004697504	Sept. 2011
Sprint	Myrtle Beach, SC	WQLI792	PCS C	Full assignment	0004908897	Jan. 2012
Sprint	Charlotte-Gastonia, NC	KNLG292	PCS C	Full assignment	0004910788	Jan. 2012
Sprint	Columbia, SC	KNLH215	PCS F	Full license (split into two parts)	0004908931 and 0004908934	Jan. 2012
Sprint	Jacksonville	KNLF274	PCS B	Assignment of 2.5 MHz in Brunswick, GA and Waycross, GA BTAs	0004908944	Jan. 2012
Leap	Chicago, IL	WQJQ707	700 MHz A	Full assignment	0004952444	Filed Nov. 23, 2011 Awaiting consent

Verizon Wireless Spectrum Assignments to Other Licensees, 2007 – Present

Buyer	Market	Call Sign	Band/Block	Area Assigned	ULS File No.	Close Date
Nex-Tech Wireless, LLC	Colorado 2 Colorado 5 Kansas 7 Kansas 13	WQJQ755 WQJQ757 WQJQ762 WQJQ766	700 MHz B	Full assignment	0005039823	Filed Feb. 6, 2012 Awaiting consent
Texas Energy Network, LLC	San Antonio, TX	WQJQ715	700 MHz A	Partial assignment (partition) of Atascosa, Bandera, Dimmit, Frio, Gillespie, Gonzales, Jim Hogg, Karnes, Kendall, Kerr, La Salle, Maverick, Medina, Real, Uvalde, Webb, Wilson, Zapata, and Zavala, TX from 700 A license	0005056498	Filed Feb. 17, 2012 Consent PN Feb. 22, 2012 Awaiting close
Texas Energy Network, LLC	Texas 19	WQJQ788	700 MHz B	Full assignment	0005056630	Filed Feb. 17, 2012 Consent PN Feb. 22, 2012 Awaiting close
United Wireless Communications, Inc.	Kansas 11 Kansas 12	WQJQ764 WQJQ765	700 MHz B	Full assignment	0005066143	Filed Feb. 21, 2012 Awaiting consent

Exhibit 2

Supplemental Declaration of William H. Stone

SUPPLEMENTAL DECLARATION OF WILLIAM H. STONE

1. I am Executive Director of Network Strategy for Verizon, and in that capacity I am responsible for advanced technology planning for Verizon Wireless, including new technology assessments, development of network evolution plans, participation in industry standard groups, and spectrum planning. I have been directly involved in the planning and deployment of Verizon Wireless' current broadband services – EVDO Rev A (“EVDO”) and LTE – and the network infrastructure to support those services. In particular, I have been responsible for assessing the company's ongoing spectrum capacity needs since the formation of Verizon Wireless over a decade ago and identifying additional spectrum that can meet those needs both in the short term and over the longer term.

2. I submit this supplemental declaration updating and expanding on my previous declarations filed in support of applications to the Federal Communications Commission in which Verizon Wireless seeks approval to acquire 122 Advanced Wireless Service (“AWS”) licenses from SpectrumCo, LLC and 30 AWS licenses from Cox TMI Wireless, LLC. I specifically address claims raised in this proceeding that Verizon Wireless does not need additional spectrum, despite the extraordinary and well-documented growing demand on wireless industry networks flowing from customers' use of broadband.

3. In brief, Verizon Wireless' current spectrum holdings will not provide sufficient capacity to meet the growing demand for mobile broadband – 4G, in particular – by 2013 in some areas and by 2015 in many more. The spectrum covered by the license assignments will enable Verizon Wireless to add needed capacity to its network, and thus help address in part the rapidly growing demand for mobile broadband. This demand shows no signs of slowing – to the

contrary it is accelerating, as more and more customers rely on wireless services for their broadband needs, buy more devices that access the Internet, use those devices more hours each day, and download more and more bandwidth-hungry applications. While the spectrum we will obtain through these transactions is needed to help meet the need for more capacity in various markets, Verizon Wireless will continue to need additional spectrum, in these markets and others, to cope with what we expect to be a continued surge in wireless broadband usage in the years ahead.

4. In this supplemental declaration, I will (1) discuss the current status of Verizon Wireless' EVDO and LTE networks and the tremendous growth in our customers' use of those networks; (2) explain how Verizon Wireless calculates future demand for LTE services and how we use that projected demand to determine spectrum need; (3) illustrate the need for additional AWS spectrum in numerous markets across the nation; and (4) explain how other solutions that some parties advise Verizon Wireless to use are already being deployed to address capacity constraints but are not anywhere close to sufficient to meet growing customer demand for mobile broadband.

Current Network Operations

5. Historically, Verizon Wireless has been a market leader in choosing new efficiency-enhancing and capacity-increasing next-generation technologies and aggressively deploying these new technologies into its network. Verizon Wireless invests more in building its network than any other wireless carrier. For instance, in 2009 Verizon Wireless spent \$6.3 billion; in 2010 the company spent \$7.7 billion; and in 2011 it spent \$8.3 billion – a total of \$22.3 billion in the preceding three years.

6. Today, the Verizon Wireless network consists of 1x (digital), 3G (EVDO), and 4G (LTE) services. Verizon Wireless' cellular (850 MHz) and PCS (1.9 GHz) licenses are deployed to provide nationwide 1x and 3G services, which currently carry all circuit-switched voice traffic and the lion's share of data and SMS traffic. Verizon Wireless' EVDO network operates on its cellular and PCS licenses and covers 294 million people, or 95 percent of the U.S. population. Our coverage includes over 2,000 rural counties (defined by the FCC as counties with 100 pops or less per square mile). EVDO connections include subscribers and Machine-to-Machine ("M2M") devices, such as automatic meter readers and automobile telematics. In 2011, EVDO traffic grew **[BEGIN CONFIDENTIAL]** **[END CONFIDENTIAL]** over 2010, and it continues to grow even as LTE usage increases. (These and other figures I provide below about data traffic are measured in terms of busy-hour downloaded megabytes (MB). Verizon Wireless considers this metric to be a good proxy for measuring total data demands on our network and projecting when additional capacity is needed, because customers download more data than they upload, and we must build our network to accommodate the time of day, known as the busy hour, when data traffic typically peaks.)

7. Verizon Wireless' LTE network was launched in December 2010 on its 700 MHz Upper C Block licenses, and now covers 200 million people in 195 markets. Verizon Wireless originally committed to cover its existing nationwide 3G footprint with LTE by year-end 2013, but it recently announced it will achieve essentially the same coverage by mid-year 2013, roughly 15 months from now.

8. LTE provides spectral efficiency gain relative to 3G, meaning that we can carry more data within the same amount of spectrum relative to 3G. The spectral efficiency gain is close to 60% compared to our 3G EVDO technology. That gain is realized through more advanced

techniques such as MIMO and faster adaptation to changing radio link conditions. In addition, LTE provides higher peak and average data rates if deployed over wider bandwidths (10x10 MHz or higher), and also provides lower latency than 3G technology.

9. Although LTE is the most efficient air interface technology available today, even that increased efficiency is not enough to meet the growing demand for LTE on the 700 MHz and AWS licenses that Verizon Wireless currently holds. The 60% increase in spectral efficiency covers only a small fraction of the projected rapid growth in LTE data traffic. Our usage projections suggest that traffic on our LTE network will surpass data usage on our EVDO network in early 2013. By year-end 2015 our LTE data traffic is projected to be 5 times the peak data traffic ever carried on our 3G EVDO network. The impact of that growth rate compounds, resulting in a more than 20-fold increase in LTE data traffic from year-end 2011 to year-end 2015.

10. To increase LTE capacity, Verizon Wireless will continue to add additional cell sites, deploy the LTE Advanced standard, and modify existing cell sites with new antennas and other equipment. Our capacity expansion plans will also put into service the AWS spectrum that we currently hold in the eastern United States. Based on current LTE data growth projections, we plan to put that AWS spectrum into service in [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] at [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] cell sites where demand is greatest, and we plan to deploy it in the majority of our cell sites in the eastern part of the country [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] However, as discussed in my initial declaration and in further detail below, technology advancements we will

deploy in the network, along with use of the AWS spectrum we currently hold, are insufficient to meet future demand, and additional spectrum is required.

Customer Trends Are Driving Capacity Demands

11. In my initial declaration, I provided data demonstrating the explosion in broadband use of our network. The most recent, year-end 2011 information confirms that rapid growth in broadband traffic is continuing.

- (1) Total data traffic on our network has increased more than [BEGIN CONFIDENTIAL] [END CONFIDENTIAL] times in the last five years. From 4Q06 through 4Q11 we experienced a compounded annual data traffic growth rate averaging approximately [BEGIN CONFIDENTIAL] [END CONFIDENTIAL] year over year. Even as traffic volume has continued to expand significantly, the rate of growth has exceeded [BEGIN CONFIDENTIAL] [END CONFIDENTIAL] in each of the past two years, meaning that data traffic has [BEGIN CONFIDENTIAL] [END CONFIDENTIAL]

- (2) Many more devices use our network, and that figure is growing faster than the number of individual customers. The number of devices has grown steadily every year. At the end of 4Q11, the company served 108.7 million connections (an increase of 6.5% over the previous year) consisting of 92.2 million retail and 16.5 million wholesale and other connections. Further expansion into M2M services and cloud computing, which are still embryonic, will fuel continued growth in the number of

overall connections. This growth alone puts increasing demand on our network and its spectrum resources.

- (3) The mix of devices is shifting toward more bandwidth-intensive devices. Each month, a greater percentage of the devices our customers use are essentially personal computers that can access the Internet and engage in a wide variety of other uses of broadband services. While 28% of our postpaid customers had smart phones as of 4Q10, that percentage grew dramatically in just the next year, reaching 44% in 4Q11 – including a 5% increase in just one quarter and a 16% increase year over year – and we expect that soon more than **[BEGIN CONFIDENTIAL]** **[END CONFIDENTIAL]** of our customers will have smartphones. We sold 7.7 million smartphones in 4Q11 alone – fully 2.1 million more than we sold in 3Q11, and 70% of postpaid phone sales were smartphones. This too drives up network demand, because customers’ use is shifting rapidly toward more broadband data services to benefit from the growing number and variety of applications – there are more than one million apps for the iPhone alone.

12. Ultimately, as wireless data usage expands, speed becomes an increasingly important end-user consideration to customers. High-speed network access is critical for applications that require high responsiveness, like two-way video communications. Alternatively, degraded speeds have a significant impact on the customer’s experience and productivity, particularly for bandwidth-intensive applications and services. Premier quality of service is a very important feature of the Verizon Wireless experience. Verizon Wireless thus engineers its 4G LTE network to provide customers not only with quick and reliable connections, but with access to

speeds that users will grow to expect as the norm – for LTE, typical download speeds of 5–12 Mbps and upload speeds of 2–5 Mbps.

13. The graph below shows both historical and projected downloaded busy-hour data on our network, and illustrates the extraordinary growth in our customers' use of data services. Starting from zero in early December 2010, LTE traffic (the blue curve) shows a sharp increase in just the first year of its availability, and we project **[BEGIN HIGHLY CONFIDENTIAL]**

[END HIGHLY CONFIDENTIAL]

Spectrum Planning Shows More Spectrum Is Needed to Serve Customers.

14. Verizon Wireless, like other carriers, must constantly assess whether it has sufficient spectrum to meet the needs of its customers, because spectrum is the raw material for all of its services and substantial lead time is required to acquire and plan for use of spectrum.

Calculating spectrum needs depends on many variables and cannot precisely determine at what point in the future spectrum resources will become constrained. In fact, as detailed in my initial declaration, data traffic has grown faster than our previous projections.

15. Moreover, capacity demands are not uniformly distributed across our network or even within individual markets. Thus, spectrum capacity must be assessed market by market and cell site by cell site, and even sector by sector, based on our mix of spectrum capacity and elements of demands both across the network and within individual markets, in the latter case to accommodate highly concentrated usage demands from, as examples, a university, a stadium, or a highway.

16. Usage trends also can vary tremendously throughout the year, as in the case of communities – including rural areas – that have high tourist or vacation traffic. Spectrum of course is not acquired at the cell site level, so we must secure spectrum in a geographic area in large enough amounts to guard against constraints occurring anywhere in that geographic area, even though as discussed below constraints will typically be seen first in heavily populated areas and business districts. As I noted in my initial declaration, planning and deployment is a multi-year process; we need to identify and acquire spectrum today to be prepared for network demands years into the future.

17. The network may experience constraints in rural areas despite fewer overall connections. We expect some customers in these areas may rely on their wireless broadband

connection more intensively than customers in urban areas where alternative high-speed broadband connections are more widespread. We also expect that new products will further increase data traffic in rural areas. In [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] Verizon Wireless will begin to offer a new product called Fusion which was recently demonstrated at the 2012 Consumer Electronics Show. Fusion will use LTE fixed wireless equipment to provide an entire home or business with broadband service. We anticipate that the data usage of these products will be significantly greater than that of a smartphone, exceeding [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] by YE 2012 and approaching [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] by YE 2016. In many cases, just one person or office using increased amounts of capacity can have significant impact on a rural cell site.

Mapping Network Constraints Using Current Spectrum Holdings

18. In my initial declaration I summarized the methodology Verizon Wireless employs on an ongoing basis to project future spectrum constraints across its LTE network. I explained generally how we collect data traffic and performance metrics such as data volumes, average user throughput, historical handset sales data and how we develop projections on future handset sales, customer data usage trends, and usage trends for new mobile applications. The data are used to forecast future data traffic in each sector of each cell site. We then convert the amount of projected data traffic to the amount of spectrum needed to meet demand and service level requirements, as the amount of spectrum available generally correlates to the amount of traffic a site or sector can handle while meeting the speed and service quality metrics for our network.

Below I provide additional information about our spectrum planning methodology and show how it yields spectrum capacity needs in diverse sample markets across the country.

19. **The Verizon Planning Instrument.** Verizon Wireless has developed a capacity and spectrum planning tool, the Verizon Planning Instrument (“VPI”), to monitor and calculate capacity needs on its EVDO and LTE networks. **[BEGIN CONFIDENTIAL]**

[END CONFIDENTIAL]

20. The VPI analysis focuses on download volumes, which are a better indicator of spectrum demand than upload volumes. Consumers generally download greater volumes of information than they upload, and thus spectrum constraints impact download network performance first. We also use busy hour traffic, since that is the time of day with the greatest demand on the network. Just as electric companies must build for peak hourly loads, we design our network for those loads. **[BEGIN CONFIDENTIAL]**

[END CONFIDENTIAL]

21. **Capacity Constraints per Cell Site Sector and the Consumer Experience.** Next we consider how these projected data levels would impact service levels and our customers' experience on the LTE network. Our involvement with LTE over the past year has demonstrated that a fully loaded cell site sector using our 700 MHz C Block spectrum to provide LTE has a projected capacity today of up to [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] while still maintaining the speeds we seek to provide to all consumers in that sector.

22. As traffic volumes exceed the data threshold, some customers will experience decreases in speed and quality, depending on the mix of use occurring at that point. Most affected will be services like video streaming and real-time two-way video conferencing. For example, a customer who is streaming video or downloading a large file is more likely to notice increased jitter or longer buffering times, while a customer on a static web site may not notice a slower speed. The further data traffic exceeds the threshold, the more widespread and substantial the degradation in customers' experience becomes. Thus while some customers using speed-intensive services like streaming in sectors at or close to the threshold will experience slower speeds, virtually all customers in sectors far exceeding the threshold will experience noticeable reductions in speed and diminished quality. Even those customers who are not downloading information or otherwise not using speed -intensive services could experience slower speeds. Real-time applications will be impacted to a greater and greater extent as available bandwidth per user continues to decrease. As latency or packet congestion continues to build in the

network, application requests for retransmission of frames may take place, further degrading the user experience.

23. Because we seek to provide all customers with the highest quality user experience our network can deliver, we are committed to developing network plans to add capacity before data traffic exceeds these thresholds. This point bears emphasis. Verizon Wireless is committed to provide all of its customers with the highest-quality experience. To accomplish that, we must ensure we have the right network deployment and sufficient spectrum in every cell sector to manage growing data traffic. The methodology I describe above is new for LTE because we are deploying the first widespread LTE network not only in the United States but in the world. We will continue to refine it as we gain more experience with LTE. However, it leverages our experience with EVDO and provides a reasonable way to calculate how the rapidly growing demand for broadband services will impact the company's existing spectrum position – and what spectrum it will need in the future.

24. **Deploying Capacity Enhancement Strategies.** Our LTE network development plans assume only our current spectrum holdings but take into account technology advancements we will incorporate to achieve additional capacity gains. The data traffic threshold to determine if a sector is spectrum constrained increases with time as we benefit from the practical use of these new tools to augment capacity including, among other investments, adoption of the LTE Advanced standard and deployment of LTE small cells.

25. While we have determined that the data traffic threshold for spectrum constrained-sectors using our 700 MHz Upper C Block spectrum should be **[BEGIN HIGHLY CONFIDENTIAL]** **[END HIGHLY CONFIDENTIAL]** at YE 2013, we expect the threshold to be higher by YE 2015 due to our plans to aggressively deploy capacity-

enhancing techniques. One of the most promising such techniques is the use of LTE small cells.

Verizon Wireless will begin implementing LTE small cells [BEGIN HIGHLY

CONFIDENTIAL]

[END HIGHLY

CONFIDENTIAL] Unlike macro cells, small cells have a more limited footprint and are typically deployed in high traffic areas to de-load traffic from the macro cell. Small cells typically have a maximum coverage area of up to several hundred meters and provide overall system capacity benefits because the RF is confined to a much smaller area than a macro cell. Small cells effectively increase the overall capacity of the macro cell coverage area in which they operate. As the technology becomes available and matures, Verizon Wireless will be deploying small cells aggressively to increase system capacity.

26. Even with the deployment of small cells on a scale of [BEGIN HIGHLY

CONFIDENTIAL]

[END HIGHLY CONFIDENTIAL] this will not be

adequate to keep pace with the projected customer growth in years 2013 to 2015 and beyond.

This is because our projected growth in data LTE usage from YE 2013 to YE 2015 will far outstrip the added capacity made available by small cells. Further, LTE small cells are unlikely to be available in the quantities we would need until sometime in [BEGIN HIGHLY

CONFIDENTIAL]

[END HIGHLY CONFIDENTIAL] past the date when many

cell sectors will be exceeding desired capacity during busy hours. Additionally, the deployment of small cells is not without challenges (and risks to the deployment schedule). For example,

providing backhaul to [BEGIN HIGHLY CONFIDENTIAL]

[END

HIGHLY CONFIDENTIAL] of small cells is one of the many challenges that must be

overcome. Installing small cells also requires us to secure necessary approvals from site owners,

which can include time-consuming negotiation of site leases, and we may not be able to secure those arrangements for locations which are most optimal for the use of small cells.

27. Deploying Existing Verizon Wireless AWS Spectrum Holdings. Verizon Wireless has 20 MHz of AWS spectrum in markets covering the eastern part of the nation, and the company plans to use this spectrum in the LTE network [BEGIN HIGHLY CONFIDENTIAL]

[END HIGHLY CONFIDENTIAL] in addition to the 700 MHz C Block which is in service. During the past several years, Verizon Wireless has taken significant steps and incurred major expense both to clear the AWS spectrum and develop LTE handsets that will operate in the AWS band.

28. We completed our first microwave incumbent relocation in 2008 (just two years into the 15 year license term of our AWS licenses), and the pace has increased significantly over time. In 2010, for example, there were 131 incumbents on our AWS spectrum with 358 microwave paths. Today there are just 34 incumbents with just 88 paths. Since 2008, Verizon Wireless has incurred nearly \$7 million in relocation expenses. In addition, Government users have also needed to clear the AWS band. In 2010 there were 109 non-classified Government links in our AWS spectrum – today there are 25 and some of those aren't expected to be cleared until June 2012.

29. Verizon Wireless plans to introduce dual band (700 MHz and AWS) LTE devices [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] Those devices have been in the planning and development stage for [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] The dual band LTE devices will be seeded into the marketplace [BEGIN HIGHLY CONFIDENTIAL]

[END HIGHLY CONFIDENTIAL] to ensure that as many

customers as possible have the dual band devices, thereby reducing capacity constraints on the 700 MHz spectrum [BEGIN HIGHLY CONFIDENTIAL]

[END HIGHLY CONFIDENTIAL] Dual band handsets will support voice applications on both frequency bands. Again, like the small cell example above, deploying the available AWS spectrum where available will not be adequate to keep pace with the projected customer growth in those areas in years 2013 to 2015 and beyond.

Market by Market Review

30. In this section I describe projected capacity constraints in numerous markets of varying size across the country. Maps depicting the capacity constraints are included at the end of my declaration for a total of 18 large and small markets across the United States. In each case, our projections show that existing spectrum will not meet demand by the end of 2015 across these markets, and in most markets, by as soon as the end of 2013.

31. As explained above, Verizon Wireless's data threshold for cell site sector spectrum constraint for 10x10 MHz LTE is [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] for YE 2013. Further, in any market in which Verizon Wireless has both 700 MHz C Block and AWS spectrum, we use thresholds twice this high [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] to account for use of AWS spectrum beginning in [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL], because adding AWS doubles our spectrum available for LTE and enables a total of 20x20 MHz for LTE in those markets. The color scheme for the maps is as follows. By the end of 2013, a sector that is colored yellow is projected to exceed the [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]

([BEGIN HIGHLY CONFIDENTIAL]

[END HIGHLY CONFIDENTIAL]

for markets in which we hold AWS spectrum) during busy hour, meaning that some customers served by this sector will experience decreases in speeds, depending on the data services they are accessing. In sectors marked red, more customers are likely to experience a more widespread and substantial degradation in speed and quality of some of their data services. By the end of 2015, red sectors are forecasted to be spectrum constrained. If the increase in capacity due to small cells and other technology advancements does not occur as anticipated, many more sectors, the ones shown as yellow, could also be spectrum constrained by that time. Again, in those markets where Verizon Wireless currently holds AWS spectrum, the maps double the data thresholds for marking a cell site sector yellow or red. It is apparent from the maps that we face capacity constraints in some parts of markets where we hold AWS as well as 700 MHz spectrum – including [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]– as early as the end of 2013. Below I describe the impact in three specific markets.

32. [BEGIN HIGHLY CONFIDENTIAL]

[END HIGHLY

CONFIDENTIAL] Verizon Wireless is currently providing LTE on its 700 MHz spectrum and holds no AWS spectrum in this market. The actual data traffic for YE 2011 and our data traffic projections for YE 2013 and YE 2015 are depicted on the attached maps, which show the locations of all operational LTE cell sites in the highest-density part of this market, the city of [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] and surrounding area, as of the three dates. Most cell sites shown are comprised of three sectors.

Each sector is color-coded to show whether we project capacity to be below or above the

[BEGIN HIGHLY CONFIDENTIAL]

[END HIGHLY

CONFIDENTIAL] spectrum constraint thresholds. The map for YE 2011 actual data traffic shows that, in all sectors, the customer experience during this period was within acceptable levels.

33. In 2013, however, many of **[BEGIN HIGHLY CONFIDENTIAL]** **[END HIGHLY CONFIDENTIAL]** cell site sectors are projected to become spectrum constrained due to the increasing demand being placed on the network – even with infrastructure enhancements and initial technology improvements. These sectors are shown on the map in yellow and red. The red sectors are of greatest concern because they are substantially above our design criteria for 2013 and therefore many customers served by these sectors are likely to experience slower speeds during many hours each day. Further, the map shows that the negative impacts on customers due to the lack of spectrum will typically appear first in high usage areas like the downtown business core. By the end of 2015, the spectrum shortage has spread well beyond the urban core of the market, and nearly all sites have sectors colored red, meaning that, absent deployment of additional spectrum, customers in this market will experience major impacts to speed and quality of service, such as latency and responsiveness of applications.

34. **[BEGIN HIGHLY CONFIDENTIAL]** **[END HIGHLY CONFIDENTIAL]** The significant impact on Verizon Wireless' LTE network capacity of rapidly growing traffic is not confined to larger markets – it includes smaller markets as well. For example, the maps for **[BEGIN HIGHLY CONFIDENTIAL]** **[END HIGHLY CONFIDENTIAL]**, with a population of only about half a million, depict the actual data traffic for YE 2011 and our data traffic projections for YE 2013 and YE 2015. Like **[BEGIN HIGHLY CONFIDENTIAL]** **[END HIGHLY CONFIDENTIAL]**, Verizon Wireless has no AWS spectrum on top of its existing 700 MHz C Block spectrum to absorb increasing

demand. Even though the population of this market is less than a fifth of [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL], the impact of data demand is very similar. Many sectors will experience spectrum constraints starting in 2013 (yellow and red). In 2015, the spectrum constraints will be severe (as indicated in red) in the majority of the cell sectors.

35. [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] The company's need for additional spectrum is not confined to markets where it only has 700 MHz spectrum, but exists in markets where it will deploy AWS spectrum as well. As discussed above, in markets such as [BEGIN HIGHLY CONFIDENTIAL]

[END HIGHLY CONFIDENTIAL] where Verizon Wireless holds 700 MHz and AWS licenses, we double the spectrum constraint thresholds. By YE 2013, [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL], the sectors shown in yellow and red are forecasted to be spectrum constrained. The red sectors are of greatest concern because they are substantially above our design criteria for 2013 and therefore many customers served by these sectors are likely to experience slower speeds during many hours each day. And by YE 2015, absent deployment of additional spectrum beyond the 700 MHz and AWS spectrum that the company currently holds, most cell sectors are projected to be red, meaning that customers across the [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] area will experience reduced speeds and quality.

36. Additional Examples of Spectrum Constrained Markets. The need for spectrum is evident from data traffic projections in many other large and small markets, including the 15 markets depicted in the additional attached maps: [BEGIN HIGHLY CONFIDENTIAL]

[END HIGHLY CONFIDENTIAL]. These markets represent various differences in population, urban business cores, geography, broadband usage characteristics, as well as a mix of markets with and without 10x10 MHz of existing AWS spectrum. As is shown in the attached maps, which depict the same time periods as the maps for [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL], all share roughly the same trends for spectrum exhaust.

37. As in the examples identified above, cell site sectors are projected to become spectrum constrained due to the increasing demand being placed on the network by YE 2013. Despite upcoming use of new advancements such as LTE small cells and LTE Advanced, and despite the 700 MHz (and in some cases AWS) spectrum already held by Verizon Wireless in these markets, the maps show that customers in these markets will experience major impacts to speed and quality of service absent additional spectrum.

38. Verizon Wireless regularly conducts similar demand projections in the markets where LTE has been deployed and the results are comparable. In market after market, the burgeoning customer demands for data and particularly their use of speed-intensive broadband services is driving up traffic on the network. Whether the “tipping point” is reached in 2013, earlier or later, the plain fact is that the company needs to secure this spectrum if its customers are to continue to experience the high quality of data service they have today.

Other Approaches to Address Capacity Demand Have Either Been Deployed, Will be Deployed as They Become Commercially Available, or Are Not Feasible.

39. Historically Verizon Wireless has used numerous methods to increase spectral efficiency, and we will continue to do so as we move forward with LTE. As noted above, the

company intends to deploy LTE small cells extensively [BEGIN HIGHLY CONFIDENTIAL]

[END HIGHLY CONFIDENTIAL] and will undertake other investments to increase LTE capacity. However, these network enhancements by themselves are not close to sufficient to meet our growing capacity needs. We need to add additional spectrum resources, and we need it soon in order to place the spectrum in use in sufficient time to address demand.

40. As an initial matter, Verizon Wireless is today – and post-transaction will continue to be – one of the most efficient users of spectrum. Today, the company services approximately 109 million wireless connections, more than any other wireless provider, using an average of 89 MHz nationwide – or an average of one megahertz of spectrum per 1.23 million customer connections. Post-transaction, we would remain among industry leaders in term of efficiency, having on average 109 MHz nationwide and an average of one megahertz of spectrum per one million customer connections. These spectrum efficiency standings demonstrate that over the years the company has invested heavily in cell density to make efficient use of our spectrum. The company has invested \$6-8 billion in network development each year over the past four years, and given our nationwide coverage, this investment has primarily been directed at next-generation technologies that deliver spectrum-efficiency enhancing upgrades and capacity deployments.

41. Some commenters suggest that, if Verizon Wireless were to deploy certain technology solutions – cell splitting, femto cells, Wi-Fi, and refarming, for example – the company’s existing spectrum resources could address our customers’ upcoming capacity constraints. These solutions are well-known to Verizon Wireless’ network engineers, and several are part of Verizon Wireless’ capacity enhancement arsenal. Indeed, some are regularly

used to address capacity needs where feasible. However, these tools simply cannot keep up with the extraordinary growth of demand on our networks. Below we describe several purported solutions.

42. **Cell Splitting.** Cell splitting (construction of additional macro cells) can be an effective tool in spot situations, but the notion that cell splitting can solve Verizon Wireless' capacity constraints is simply not realistic. When many sectors are projected to become spectrum constrained, we cannot keep up with high and widespread growth by using cell splitting alone.

43. Verizon Wireless nonetheless plans to deploy [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] While cell splitting is sometimes effective and practical to meet increased demand, the benefits of that technology are limited. As we place more and more sites close together, the benefits of additional sites diminish, particularly relative to the zoning, equipment, construction and other expenses necessary to deploy more sites. Further, to obtain the maximum capacity gains from cell splitting, we must be able to locate a new cell in a relatively specific spot or small geographic area – which is limited by the availability of tall structures or the ability to construct a tower. Indeed, cell splitting often does not deliver the expected gains due to real estate constraints that limit where we can build new cell sites.

44. Further, in many instances cell splitting is not a strong alternative due to cost. For instance, the average cost of a new cell site is [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] although this cost can approach [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL] in rural areas where unusual construction may be required or lengthy high capacity backhaul facilities to support LTE

may need to be purchased. Moreover, a cell split only provides a capacity benefit to 3 sectors at adjacent cell sites. For that same cost we can typically [BEGIN HIGHLY CONFIDENTIAL]

[END HIGHLY CONFIDENTIAL] if

we activate available spectrum. The ongoing recurring costs are also much higher for cell splitting compared to activating available spectrum. Typically the recurring costs are two to four times higher for new cells compared to activating available spectrum. In addition cell splitting is a slow and time consuming process. Putting available spectrum to use can be achieved much faster than cell splitting.

45. **Femto Cells.** As noted above, Verizon Wireless will deploy LTE small cells to enhance capacity across the network in the coming years, but the suggestion by some commenters that femto cells (with far smaller coverage areas) can solve capacity constraints is not accurate. Femto cells are located on customer premises and use the carriers' authorized frequencies to communicate with the user's devices, but they carry the traffic to and from the carrier's network over a separate Internet connection, thus reducing the capacity demands on the carrier's network. Verizon Wireless has deployed many 3G femto cells and has plans to deploy a substantial number of LTE femto cells after they become available in [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL]. While femto cells provide some congestion relief, they will never be able to meet the skyrocketing demand that I detailed above, because they offload only a small fraction of a sector's traffic. Moreover, femto cells are much less effective at providing capacity when deployed close to a macro cell.

46. **Wi-Fi.** Verizon Wireless invests in Wi-Fi networks on a limited basis where spectrum constraints are extremely severe, for instance in stadiums and concert halls, but generally does not view Wi-Fi offloading as a good solution to congestion. First, most Wi-Fi

networks are owned by third parties that generally are not in the business of offering wireless services, and offer Wi-Fi as an enticement to purchase other products like coffee or hotel stays. These providers do not offer the same security, reliability, and user experience that Verizon Wireless has built its reputation on. Second, Wi-Fi uses unlicensed spectrum and it is difficult to control interference that can greatly degrade the capacity of a Wi-Fi access point and thus impact the customer experience. Given the company's commitment to providing the highest possible quality and reliability of its services, Verizon Wireless has determined not to force customers onto Wi-Fi networks. Rather, we believe that the most consumer-friendly solution is to provide LTE in tandem with Wi-Fi services, giving consumers the ultimate power to choose between the two services. We do this by providing our customers Wi-Fi capable devices that make it easy for the customer to select Wi-Fi through the settings menu or in some cases notifying the customer of available Wi-Fi networks as the device detects their availability. Finally, while many of our customers do choose Wi-Fi and will certainly continue to do so, our data traffic projections already factor this behavior into the calculation and the conclusion remains the same – the demand for wide-area broadband service requires additional spectrum.

47. **Refarming of Cellular and PCS Spectrum.** Transitioning Verizon Wireless' PCS and cellular spectrum from EVDO and voice services to LTE is not a realistic alternative to address the significant and pervasive networks constraints we will face over the next few years. As an initial matter, overall traffic continues to increase on the EVDO network even as some customers migrate to the LTE network. (See the graph accompanying Paragraph 13 above.) Thus while traffic is migrating to LTE, spectrum deployed for EVDO is not fallow, but is filled by the growing data demands of remaining users. Put another way, customers are not yet moving to LTE fast enough to stop, and reverse, EVDO traffic growth. Our separate projections

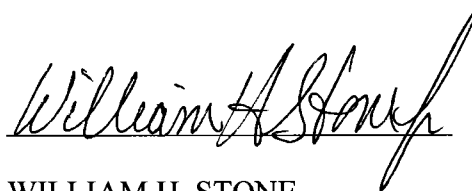
on EVDO network usage indicate that the growth in EVDO usage is expected to continue until [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL], by which time the rate at which users switch to LTE is forecasted to become high enough to overcome the growth in data demand for the EVDO customers that remain. While Verizon Wireless will likely offer various incentives to customers to upgrade to LTE devices, many customers will choose not to transition and we plan to support those customers by continuing EVDO for many years into the future. Further, there are many M2M modules that are integrated into other products such as vehicles that cannot be easily upgraded. Those devices will continue to rely on the EVDO network until they are retired or replaced by products that use LTE modules – a process that will take many years.

48. Additionally, we are presently seeing continued growth in usage of our EVDO network, which itself is spectrum constrained in various markets. Once EVDO growth subsides, it will take time before sector traffic returns to a more normal level, and then additional time before traffic subsides further to allow refarming in some markets. Initially, refarming opportunities will occur with 1.25x1.25 MHz channels and only on a piecemeal basis. For LTE, Verizon Wireless has deployed service using 10x10 MHz channels to meet customer expectations for speed. A 1.25x1.25 MHz LTE channel can only support peak speeds that are 1/8th of the peak speeds on a 10x10 MHz channel, and thus is not a viable solution due to the inconsistency in the customer experience. At a minimum, Verizon Wireless will require 5x5 MHz channelization for LTE deployment in refarmed spectrum in order to achieve a significant benefit from deployment. The earliest timing for freeing up 5x5 MHz of such spectrum for LTE deployment is [BEGIN HIGHLY CONFIDENTIAL] [END HIGHLY CONFIDENTIAL], and that will occur on a piecemeal basis and likely in the more lightly

loaded cells (the cells shown in green on the attached sample market maps) where we do not need additional capacity. Simply put, the future refarming of spectrum used to support EVDO will not address growing spectrum demand.

49. **Lower 700 MHz Spectrum.** While we hold various Lower 700 MHz Band licenses, this spectrum is not as suitable for our LTE capacity requirements in the near term. First, Lower 700 MHz A and B bands are difficult for us to include in our LTE devices because our devices must support both the 700 MHz Upper C Band and AWS. The Lower 700 MHz Band requires an additional duplexer in each device because of the spectral distance between the Upper and Lower 700 MHz bands, and this is particularly challenging because it is more complex to add a duplexer that operates below 1 GHz. (These device design issues are not faced by other Lower A and B licensees which do not hold 700 MHz Upper C Block spectrum.) Second, our ability to deploy service on various A Block licenses is complicated by FCC rules that require us to avoid interference to Channel 51 reception by TV receivers in some of the markets where we hold A Block licenses, and by the need to plan for potential interference from adjacent bands licensed for high-power operations. Third, in many markets we hold a Lower Band A Block or a B Block license but do not hold both. A or B alone only provides us with a 5 X 5 block of spectrum, which cannot deliver the throughput we design for on the larger Upper 700 C Block and AWS spectrum bands. These issues may not affect other 700 A and/or B Block licensees, but they contributed to our decision to focus on the use of AWS as the most suitable spectrum for adding to our LTE capacity.

I hereby declare under penalty of perjury that the foregoing declaration is true and correct to the best of my knowledge and belief. Dated this 1 day of March, 2012.

A handwritten signature in cursive script, reading "William H. Stone", written over a horizontal line.

WILLIAM H. STONE



Maps Depicting Capacity Constraints in 18 Markets

{{

}}

{{



- CMA
Population:
493K
- 700 Upper C
- AWS-F

}}



{{

}}



{{

}}

{{



- CMA Population:
4.4M
- 700 Upper C
- AWS-F

}}



{{

}}



{{

}}

{{



- CMA Population:
8.5M
- 700 Upper C
- AWS-F

}}



{{

}}



{{

}}



- CMA Population: 632K
- 700 Upper C
- No AWS spectrum



{{

}}



{{

}}

{{



- CMA Population: 1.5M
- 700 Upper C
- AWS-F

}}



{{

}}



{{

}}

{{



- CMA Population:
6.4M
- 700 Upper C
- No AWS
spectrum

}}



{{

}}



{{

}}

REDACTED – FOR PUBLIC INSPECTION



- CMA Population: 2.7M
- 700 Upper C deployed
- No AWS spectrum



{{

}}



{{

}}



- CMA Population: 1.9M
- 700 Upper C
- No AWS spectrum



{{

}}



{{

}}

{{



- CMA
Population:
17.5M
- 700 Upper C

}}



{{

}}



{{

}}

{{



- CMA
Population:
1.5M
- 700 Upper C
- AWS-F

}}



{{

}}



{{

}}

{{



- CMA
Population:
1.5M
- 700 Upper C
- AWS-F

}}



{{

}}



{{

}}

{{



- CMA
Population:
16.7M
- 700 Upper C
- AWS-F

}}



{{

}}



{{

}}

{{



- CMA Population:
4.0M
- 700 Upper C
- No AWS
spectrum

}}



{{

}}



{{

}}

{{



- CMA
Population:
248K
- 700 Upper C
- AWS-F

}}



{{

}}



{{

}}



{{

- CMA Population: 184K
- 700 Upper C
- AWS-F

}}



{{

}}



{{

}}

{{



- CMA
Population:
2.6M
- 700 Upper C
- AWS-F

}}



{{

}}



{{

}}

{{



- CMA
Population:
4.6M
- 700 Upper C
- AWS-F

}}



{{

}}



{{

}}



- CMA Population: 555K
- 700 Upper C
- No AWS spectrum



{{

}}



{{

}}

Exhibit 3

Declaration of David E. Borth

A Review of Various Technical Issues Raised in the
Verizon Wireless Spectrum Transactions with
SpectrumCo and Cox TMI Wireless

and

An Assessment of SpectrumCo's Efforts to Develop
Its AWS Spectrum

DECLARATION OF DAVID E. BORTH

1. I am Dr. David E. Borth. I am an independent consultant and a Professor of Electrical and Computer Engineering at the University of Illinois-Chicago, where I joined the faculty in January 2012. Prior to my current work, I was employed by Motorola, Inc. (“Motorola”) for 30 years. At Motorola, I served in a number of roles, including 25 years in its central research labs, eventually becoming Corporate Vice President and Director of Wireless Access Research for Motorola Labs. I also served as Chief Technology Officer and Director of Advanced Technology for the Government and Public Safety business of Motorola (now Motorola Solutions), where I was involved in the application of LTE to the Public Safety 700 MHz band.

2. I am the author or co-author of more than 25 papers and five books. I also am the inventor or co-inventor of more than 30 patents. I have served on a number of National Research Council panels, the FCC Technical Advisory Council, and the Department of Commerce Spectrum Management Advisory Committee. I am a Fellow of the IEEE and was elected to the National Academy of Engineering. My full CV is attached to this declaration.

3. I have been asked by counsel for SpectrumCo, LLC (“SpectrumCo”) and Celco Partnership d/b/a Verizon Wireless (“Verizon Wireless”) to provide independent expert opinions on the subjects discussed in this declaration. In preparing this declaration, I have relied on my professional experience and the knowledge I have gained through 30 years of experience as a wireless engineer and corporate executive with a leading cellular handset and base station equipment provider, and on my experience in the design, development, and deployment of cellular systems, including the deployment of LTE systems. I have also relied on information

provided by SpectrumCo and Verizon Wireless, and on books, reports, and papers on the topics described herein.

4. I have reviewed the applications for FCC consent to the proposed spectrum license assignments from SpectrumCo and Cox TMI Wireless, LLC (“Cox Wireless”) to Verizon Wireless, including the declarations by William H. Stone, Verizon’s Executive Director of Network Strategy (Exhibit 3 of the Public Interest Statement attached to each application) (the “Dec. 2011 Stone Declarations”), as well as Mr. Stone’s supplemental declaration, which is Exhibit 2 to the March 2, 2012 Joint Opposition to Petitions to Deny and Comments in WT Docket No. 12-4 (the “Supplemental Stone Declaration”). I have had in-depth discussions regarding the substance of the Dec. 2011 Stone Declarations and the Supplemental Stone Declaration with Mr. Stone and other Verizon Wireless engineers. I also have reviewed the December 16, 2011 declaration of Robert Pick, Chief Executive Officer of SpectrumCo (Exhibit 4 of the Public Interest Statement attached to the Verizon Wireless-SpectrumCo application) (the “Pick Declaration”), and interviewed Comcast personnel who have devoted significant time and attention to SpectrumCo matters.

5. This declaration is divided into two parts. Part I analyzes a number of technical issues that have been raised in connection with the proposed spectrum license assignments from SpectrumCo and Cox Wireless to Verizon Wireless and provides an independent assessment of the methodology employed and the conclusions reached by Verizon Wireless in its decision to purchase Advanced Wireless Services (“AWS”) licenses from SpectrumCo and Cox Wireless. Part II of this declaration reviews the steps that SpectrumCo has taken to date with respect to the

122 AWS licenses it holds and assesses the technical and engineering conclusions SpectrumCo has reached with respect to the licenses.

6. As detailed in Part I of this declaration, I have concluded that (1) in light of the rapidly growing demand for mobile broadband, Verizon Wireless has used appropriate tools to project the demands that such use will increasingly place on its network; (2) Verizon Wireless uses a reasonable and appropriate methodology to assess capacity constraints on its network in light of existing spectrum resources and has reasonably concluded that data traffic volumes will outstrip capacity in 2013 in some areas and in 2015 in many more, creating a need to acquire additional spectrum; (3) other methods for expanding network capacity – such as cell splitting, use of femto cells, offloading data traffic to WiFi networks, refarming existing spectrum, and deployment of LTE small cells – alone are insufficient to meet the projected demand; and (4) the alternative capacity-enhancing approaches suggested in petitions to deny, including software defined radios, mesh networking, channel bonding, use of unlicensed frequencies, and deployment of distributed antenna systems (DAS), are not viable solutions to address the increase in demand.

7. As detailed in Part II of this declaration, I have concluded that SpectrumCo did everything a reasonably diligent new entrant AWS licensee might be expected to do within the first third of its license term and took meaningful steps to develop, use, and identify long-term business plans for the spectrum. I have reviewed the circumstances surrounding SpectrumCo's analysis of the AWS spectrum as set out in the Verizon Wireless-SpectrumCo Public Interest Statement and the Pick Declaration, and further concluded that SpectrumCo reasonably determined that 20 MHz of AWS spectrum was not enough to fulfill the long-term business

plans of its owners, given the fact that SpectrumCo would have been a new entrant constructing a greenfield mobile wireless network intended to provide both voice and advanced data services.

**Part I - A Review of Various Technical Issues Raised in the
Verizon Wireless Spectrum Transactions with SpectrumCo and Cox TMI Wireless**

8. **Factual Background.** As explained in the Supplemental Stone Declaration, the Verizon Wireless network provides voice, data and mobile broadband services using the 1x (digital), 3G (EVDO), and 4G (LTE) technologies. Verizon Wireless' digital and EVDO services are provided over its spectrum licenses in the cellular (850 MHz) and PCS (1.9 GHz) bands, where all voice traffic and most data and SMS traffic are currently carried.¹

9. Verizon Wireless launched its 4G LTE network in December 2010, using its 700 MHz Upper C Block licenses. Verizon Wireless has announced that it will cover essentially all of its existing nationwide 3G footprint with LTE by mid-year 2013.

10. Verizon Wireless also holds spectrum licenses in the AWS band² in the eastern United States (20 MHz (2 x 10 MHz)), and has plans to deploy LTE service over that spectrum at cell sites where data demands are highest, and over the next few years at the majority of its cell sites in the eastern part of the country.

11. **Verizon Wireless Projections of Data Demands on Its Network.** Data traffic on the Verizon Wireless network has nearly doubled in each of the past five years, with the pace of

¹ See Supplemental Stone Declaration ¶ 6.

² The AWS-1 band consists of two paired spectrum bands: 1710-1755 MHz and 2110-2155 MHz.

growth accelerating over the past two years.³ AT&T has recently also reported a doubling in wireless data traffic on the AT&T cellular network from 2010 to 2011.⁴ Furthermore, Cisco recently released its latest Visual Networking Index, which details the same phenomenon globally.⁵ The Supplemental Stone Declaration updates the figures provided in the Dec. 2011 Stone Declarations, confirms that the rapid growth in broadband traffic on the Verizon Wireless network is continuing, and projects traffic levels into the future.⁶

12. The use of historical data to project future trends is the appropriate way to make such projections, and Mr. Stone's projections regarding the rapid increase in broadband data demand that will be imposed on the Verizon Wireless network are consistent with both industry trends and Verizon Wireless' experience. In my expert opinion, the projections of data demand made by Mr. Stone are reasonable and provide an appropriate foundation upon which to make assessments as to spectrum planning.

13. **Verizon Wireless' Assessment of Capacity Constraints.** In my experience, I have found that wireless carriers must continually assess whether their spectrum holdings are sufficient to meet their needs. As noted in the Supplemental Stone Declaration, Verizon

³ See Dec. 2011 Stone Declarations ¶ 6.

⁴ See John Donovan, Senior Executive Vice President – Technology and Network Operations, AT&T, “Wireless Data Volume on Our Network Continues to Double Annually,” AT&T Innovation Space Blog (Feb. 14, 2012), available at <http://www.attinnovationspace.com/innovation/story/a7781181>.

⁵ Cisco observes that “[g]lobal mobile data traffic grew 2.3-fold in 2011, more than doubling for the fourth year in a row” and predicts that such traffic “will increase 18-fold between 2011 and 2016.” CISCO VISUAL NETWORKING INDEX: GLOBAL MOBILE DATA TRAFFIC FORECAST UPDATE, 2011–2016 (Feb. 14, 2012), available at http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.html.

⁶ See Supplemental Stone Declaration ¶¶ 11-13.

Wireless is no different. Indeed, Verizon Wireless assesses its spectrum capacity on a market-by-market, cell site-by-cell site, and even cell sector-by-cell sector basis, taking into account the mix of spectrum capacity and elements of demand both across the network and within individual markets.⁷ This kind of sector-by-sector analysis, which is necessary because capacity overloads occur in individual sectors and not just in individual cells, enables Verizon Wireless to gain a deep understanding of the capacity constraints of its network and their effects on customers, and is an appropriate way to do network planning.

14. Verizon Wireless makes use of an internally-developed capacity and spectrum planning tool known as the Verizon Planning Instrument (“VPI”) to monitor and evaluate capacity needs on its LTE and EVDO networks. Projected data levels are used to determine the impact on service levels and customer experience on the LTE network.⁸ Through experience gained from operating an LTE network, Verizon Wireless has empirically observed the data throughput that a fully loaded LTE cell site sector can support given the amount of spectrum employed and still maintain the speeds expected by all customers.⁹ (Verizon Wireless considers LTE speeds of 5-12 Mbps downstream and 2-5 Mbps upstream as the goal for its customers.)

15. The following analysis verifies the figures provided by the VPI regarding the maximum traffic limit of an LTE cell site sector. Assume an LTE system (3GPP Release 8) is deployed in paired 10 MHz blocks of spectrum (i.e., 2 x 10 MHz). An often quoted number for the peak downlink data rate in an LTE sector operating in 10 MHz of spectrum is 86 Mbps assuming 2x2

⁷ See Supplemental Stone Declaration ¶ 15.

⁸ See *id.* ¶¶ 19-20.

⁹ See *id.* ¶¶ 21-23.

MIMO (multiple input-multiple output (antenna system)).¹⁰ In reality, this assumes the sector is isolated from all other sectors (i.e., no cochannel interference), 2x2 MIMO is operational, and no error correction coding has been applied – meaning there is no rate reduction due to the FEC (Forward Error Correction) coding. If the sector is now assumed to be operating in a realistic cellular environment with cochannel interference from the neighboring sectors and the performance is averaged over the entire sector, the average sector throughput is reduced to 16.7 Mbps.¹¹ At the data speeds that Verizon Wireless provides LTE service to its customers, total sector throughput on a per-hour basis will necessarily be lower. I therefore conclude that the cell site sector capacity thresholds employed in the Supplemental Stone Declaration are reasonable given the assumed data speeds.

16. In the Supplemental Stone Declaration, the cell site sector capacity limit derived under the VPI is applied to particular cell site sectors in 18 markets using actual data traffic figures from YE 2011 and data traffic projections for YE 2013 and YE 2015. The maps supplied with the Supplemental Stone Declaration indicate, based on projected traffic, the specific cell site sectors in which traffic volumes are expected to exceed current capacity, causing customers to experience degradation in the speed and quality of data services. At YE 2011, after one year operating its LTE network, Verizon Wireless had no spectrum constraints in any of the markets selected. Beginning in YE 2013, however, many sectors will begin to become spectrum

¹⁰ See Motorola White Paper, REALISTIC LTE PERFORMANCE: FROM PEAK RATE TO SUBSCRIBER EXPERIENCE, dated 2010, available at <http://business.motorola.com/experiencelte/lte-depth.html>; NGNM Alliance, GUIDELINES FOR LTE BACKHAUL TRAFFIC ESTIMATION, dated July 3, 2011, available at <http://www.ngmn.org/home.html>

¹¹ It should also be noted that LTE is a packet based system. In any packet system, as the throughput of the system approaches the capacity of the link, the queuing delay in processing packets increases significantly, thereby degrading the user experience. James F. Kurose and Keith W. Ross, COMPUTER NETWORKING, THIRD EDITION, Pearson/Addison Wesley (2005), at 256.

constrained (yellow) with some severely constrained (red). By YE 2015, many cell sites sectors will be severely constrained (red).¹²

17. My independent review of the capacity constraint analysis set forth in the Supplemental Stone Declaration leads me to conclude that the methodology employed therein to determine whether data volumes would exceed cell site sector capacities is sound and provides a reasonable basis upon which to conduct spectrum planning. This is precisely the type of analysis that a reasonable and responsible wireless carrier would be expected to engage in so as to ensure the future viability of its network. In my opinion, taking into account the alternative capacity-enhancing measures that Verizon Wireless states that it will invest in (see discussion below), the VPI accurately projects areas where Verizon Wireless customers are likely to experience substantial degradation in the speed and quality of data services absent the addition of spectrum. In short, taking into account the inadequacy of those other measures to meet the projected demand, my expert opinion is that Verizon Wireless will not be able to continue to meet its LTE service goals unless it is able to acquire additional spectrum.

18. **Capacity-Enhancing Measures Currently Employed by Verizon Wireless.** The Supplemental Stone Declaration notes that Verizon Wireless' LTE network development plans assume that cell site sector capacity limits will increase over time from the adoption of the LTE Advanced standard and the deployment of LTE small cells.¹³ It also identifies other approaches, aside from acquiring additional spectrum, to address capacity demand that either already have

¹² See Supplemental Stone Declaration ¶¶ 30-37. In markets where Verizon Wireless currently holds AWS spectrum, the maps double the data thresholds for marking a cell site sector yellow or red.

¹³ See *id.* ¶ 24.

been deployed, will be deployed, or are not feasible.¹⁴ I would like to comment further on several of these approaches, and on Mr. Stone's conclusion that, while these measures will have some impact, they will be inadequate to meet the projected demands.

19. Cell splitting. As the capacity of a particular macro cell site is exceeded, the cell may be split – that is, additional cell sites using the same frequency planning are added in addition to a given cell to provide coverage over a particular area. Theoretically, for an N=1 frequency reuse plan such as that used in LTE systems,¹⁵ each additional cell site provides a capacity equivalent to the original site. Thus capacity is enhanced without requiring any new spectrum. This attribute of cellular systems has been used for many years as new wireless carriers came on board, initially with a minimal footprint followed by a built-out system. The drawback of cell splitting is that as more and more sites are placed close together, the benefits derived from adding a site decline relative to the costs associated with building an additional site and the time required to actually locate a new base station. Furthermore, the actual capacity improvement in dense systems within a small geographic area is limited to a capacity improvement in the 3 sectors at adjacent cell sites that face the newly-added cell. In addition, if an entire area is capacity limited (such as is the case for the projected data traffic growth in the 3 cities analyzed in the Supplemental Stone Declaration as well as in several others shown in the maps attached to that declaration), then cell splitting is not an acceptable choice from a cost and time viewpoint. As noted in the Supplemental Stone Declaration, Verizon Wireless does deploy split cells in situations where doing so is effective and practical to meet increased demand.¹⁶ In my judgment,

¹⁴ See *id.* ¶¶ 39-49.

¹⁵ A system with an “N=1 frequency reuse plan” reuses all frequencies in every sector of every cell.

¹⁶ See Supplemental Stone Declaration ¶ 43.

Verizon Wireless has reasonably concluded that the benefits that can be derived from cell splitting are limited and that, to address widespread increases in data demand, adding additional spectrum at cell site sectors is both much more cost effective and faster than widespread cell splitting.

20. Use of femto cells. For users in some locations (e.g., office and apartment buildings), high speed access to the carrier network can be accomplished through the use of a femto cell. This is a low power eNodeB that is located in the customer premises and that uses the carrier's authorized frequencies to communicate with the user's devices but uses an Internet connection to the carrier to carry the traffic to and from the user to the carrier network. With careful planning, interference to the larger macrocell network is minimized while locally enhancing the network capacity without requiring any additional spectrum. The emphasis here is on the term locally; an individual user or very small group of users operating in the same building may indeed enjoy higher data speeds because of the Internet connection to the carrier network, but the overall impact on total network capacity is quite limited. I therefore agree with Mr. Stone's conclusion that, because they can only offload a small fraction of any sector's traffic, femto cells "will never be able to meet the skyrocketing demand"¹⁷

21. Offloading data traffic to Wi-Fi. Most smartphones today also have Wi-Fi capability. By relying on the high availability of Wi-Fi networks and hotspots, user data traffic may be sent to and from the carrier network via Wi-Fi without making use of the carrier's spectrum. High speed data may thus be offloaded from the carrier's cellular network. Consumers today regularly

¹⁷ *Id.* ¶ 45.

make use of this capability for significant downloads of data, and, in fact, Verizon Wireless has already factored in this behavior into its data traffic projections.¹⁸

22. As noted in the Supplemental Stone Declaration, Wi-Fi networks make use of unlicensed spectrum and are therefore subject to interference that can degrade the Wi-Fi access point capacity.¹⁹ For this and other reasons, Verizon Wireless has decided not to automatically push its customers off of its EVDO and LTE networks, but rather gives them the choice to use third-party Wi-Fi. Verizon Wireless does deploy its own Wi-Fi networks to handle special traffic situations during special events and in venues like stadiums.²⁰ From my own experience in wireless systems, I concur with the viewpoint of Verizon Wireless. Wi-Fi networks can provide some level of additional capacity, but their operation is outside the control of any wireless carrier and therefore could cause users to suffer a degraded experience compared to that offered by Verizon Wireless. I believe that Verizon Wireless' decision not to force its customers onto Wi-Fi networks is a reasonable one.

23. Refarming existing spectrum that Verizon Wireless currently holds. As noted above, Verizon Wireless currently holds spectrum and provides services in several bands: 1X and 3G services in the cellular (850 MHz) and PCS (1.9 GHz) bands, LTE in the upper C block 700 MHz. It will also support LTE in the AWS spectrum that Verizon Wireless holds in the eastern United States. Thus, the only spectrum bands in use that might potentially be refarmed for

¹⁸ See *id.* ¶ 46. Verizon Wireless includes Wi-Fi chipsets in all of its smartphones and allows its customers to use Wi-Fi networks

¹⁹ See *id.*

²⁰ *Id.*

deployment of LTE by Verizon Wireless are the cellular and PCS spectrum bands in which Verizon Wireless holds licenses.

24. At the present time, even though data traffic is moving to LTE, overall traffic on the Verizon Wireless EVDO network also continues to grow.²¹ A very large number of devices therefore will continue to operate using EVDO as customers will choose not to transition. Furthermore, EVDO supports certain types of machine-to-machine devices that are not easily upgraded. Hence it is reasonable for Verizon Wireless to continue to operate its EVDO network for many years beyond 2015. This is not at all unusual in the wireless industry; even though the wireless carriers would like to transition their customers to the latest spectrally efficient technology, a significant percentage of customers will choose not to upgrade. Some earlier examples of this include the availability of analog AMPS cell systems long after the entire transition of the cellular industry to digital²² and the availability of D-AMPS (IS-54/IS-136) cell systems long after the move to higher speed digital cellular systems.²³

25. An additional issue with refarming spectrum is the availability of enough contiguous frequencies to permit reconfiguration of EVDO cell sites to LTE cell sites. While the current LTE standards permit channelization from 1.4 MHz to 20 MHz (with corresponding FDD paired spectrum), in order to offer data rates that would be minimally acceptable under Verizon Wireless' standards, an LTE system must operate with at least 10 MHz (2 x 5 MHz) of spectrum. Since EVDO operates on paired 1.25 MHz channels, at least 4 (or more to allow for adjacent system interference from EVDO signals) contiguous channels of PCS spectrum must be free in a

²¹ See *id.* ¶ 13 (graph).

²² AMPS went into service in 1983 and was formally retired in most of the U.S. by February 2008.

²³ D-AMPS was standardized in 1990 and was retired from service in most of the U.S. by 2009.

sector in order for a successful conversion to an LTE system. Verizon Wireless in due course will be able to free up this amount of PCS spectrum only on a piecemeal basis and only in the more lightly loaded cells.²⁴ Hence refarming may be a good idea in theory, but it will take a significant amount of time to even partially implement and perhaps a very long time to fully implement. Based on the above, in my view the refarming of spectrum currently licensed to Verizon Wireless therefore provides no solution to the capacity constraints that the company's network will begin to feel within a relatively short time.

26. **Alternative Capacity-Enhancing Approaches Identified in the Petitions to Deny.** A few parties challenging the proposed spectrum license assignments have suggested that, instead of acquiring the AWS spectrum licenses, Verizon Wireless should invest in additional potential methods to address spectrum limitations.²⁵ Some of these alternatives have already been addressed immediately above. The others will be addressed technology by technology below.

27. Software defined radios. Software defined radios are radios in which the air interface and operating frequency and/or the user applications interface are controlled via software. Many existing radio architectures now use software defined radio technology although often times this feature is hidden from the user. While software defined radios can form the basis for a complete system that might someday realize higher capacity levels, they cannot provide a direct impact to help enhance the capacity of an already fully-developed wireless network like Verizon Wireless'.

²⁴ See Supplemental Stone Declaration ¶ 48.

²⁵ See Petition to Deny filed by Free Press, WT Docket No. 12-4 (filed Feb. 21, 2012); Petition to Deny filed by Public Knowledge, Media Access Project, New America Foundation, Benton Foundation, Access Humboldt, Center for Rural Strategies, Future of Music Coalition, National Consumer Law Center, and Writers Guild of America, West, WT Docket No. 12-4 (filed Feb. 21, 2012).

28. Mesh networking. Mesh networking is a type of radio system architecture whereby each transceiver or node in the system serves not only as a transceiver for an individual user but also as a relay node in the overall network to relay transmissions from other users to other nodes in the network. Mesh networks have been utilized for military systems and for Wi-Fi networks. Usually these networks are single frequency systems so that each node can hear all adjacent nodes. While mesh networking can provide improved connectivity among nodes in wireless networks, it often does this at the expense of increased delay and congestion within the network. It can be shown that the capacity of an entire mesh network grows as more nodes are added to the network, but the throughput per node decreases with an increase in the number of nodes in the network. Thus, the use of mesh networks can actually degrade the throughput made available to individual users as more nodes are added to the network. In my opinion, therefore, mesh networking is not an appropriate method to enhance cellular system capacity.

29. Channel bonding. Channel bonding groups together various available frequencies in a wireless system to form a bonded channel of the required bandwidth. Unused frequencies are therefore put to use. This requires the air interface to be highly reconfigurable at the expense of added system complexity. For an LTE system, this also requires that two sets of bonded channels are formed – one for the uplink, the other for the downlink. Furthermore, since the bonded channel is made up of disparate and not contiguous frequencies, special care must be paid to channel sounding and synchronization as well as interference from adjacent OFDM carriers.

30. The need to bond channels typically can arise when a wider bandwidth is required for a higher data rate, in which event channel bonding can artificially create such a wider carrier

bandwidth. While in this case the technology is potentially useful, it does not increase either the peak spectrum efficiency of the sector or the actual coverage spectrum efficiency of a loaded sector.

31. Use of unlicensed frequencies. In addition to the Wi-Fi bands at 2.4 GHz and at 5 GHz, in the U.S. there are a number of other unlicensed frequencies available for deployment of unlicensed services at 902-928 MHz, 1920-1930 MHz, the TV white space spectrum, and selected other frequency bands, in addition to those frequency bands where low power part 15 devices may be deployed. The reasons supplied in the Supplemental Stone Declaration for Verizon Wireless' decision not to force customers onto Wi-Fi networks apply with equal force to these other unlicensed frequency bands. Verizon Wireless has stated a desire to ensure that its customers receive the highest possible quality and reliability. Given that unlicensed bands are shared bands with all sorts of possible uses, the quality and reliability of using these frequencies cannot be guaranteed. Thus, unlicensed frequencies should not be relied upon to enhance system capacity.

32. Next generation standards. As has been the trend in the cellular standards arena, future standards often improve upon the performance of older standards. Such is the case with LTE. The first release of LTE, 3GPP Release 8, was superseded by further system improvements in 3GPP Release 9, which remained backward compatible. In April 2011, the standard for 3GPP Release 10 was set. 3GPP Release 10 addresses the next evolution of LTE known as LTE Advanced. LTE Advanced offers enhanced performance over LTE in two ways – the first by using more spectrum (up to 100 MHz); the second by using this spectrum more efficiently. The improvement in spectral efficiency (and a corresponding increase in spectral capacity) is

expected to be made possible by enhanced downlink MIMO transmission through an increase in the number of antennas in both the eNodeB as well as in the user equipment – up to 8 antennas in each. However, there are limitations in the number of antennas that can be practically deployed. At the cell site, the number of antennas is constrained by aesthetics, wind loading, cabling, antenna mast mechanical limits, and local zoning issues, among other issues. In the user equipment, it is very difficult to locate more than 2 independent antennas within the space constraints of today's physically shrinking user equipment – handsets, tablets, dongles. Furthermore, the MIMO gains expected with the added antennas may not fully be realized because of the close proximity of antennas to each other in a given sector antenna mast or in the user equipment. For these reasons and because of the current uncertainty associated with the timeline of the rollout of equipment for LTE Advanced, it is unlikely in my opinion that an LTE Advanced system rollout will obviate the need for additional spectrum before system capacity is exceeded in many sectors of the Verizon Wireless LTE system.

33. Deployment of Distributed Antenna Systems (DAS). Distributed Antenna Systems replace a single antenna radiating at high power with a group of multiple antennas, each radiating at low power to cover the same area as the high power antenna. One version of a DAS is a leaky coax antenna system – a type of technology that has been used for years to cover tunnels, transit stations, etc. The essential aspect of DAS is that it is used to provide improved coverage of an area that might not otherwise be covered by an existing conventional cell system. So deploying distributed antenna systems will not make a contribution to enhancing system capacity but may improve system coverage.

Part II - An Assessment of SpectrumCo's Efforts to Develop Its AWS Spectrum

34. This section of the declaration reviews the steps SpectrumCo has taken with respect to the 122 AWS licenses it holds and assesses the technical and engineering conclusions SpectrumCo has reached with respect to the licenses. This review has been conducted in furtherance of the application SpectrumCo and Verizon Wireless have filed with the FCC to assign SpectrumCo's AWS licenses to Verizon Wireless.

35. Based on the analysis set forth below, I have reached the following conclusions:

- SpectrumCo did everything a reasonably diligent new entrant AWS licensee might be expected to do within the first third of its license term and took meaningful steps to develop, use, and identify long-term business plans for the spectrum.
- As described in the Verizon Wireless-SpectrumCo Public Interest Statement and the Pick Declaration, SpectrumCo reasonably determined that 20 MHz of AWS spectrum was not enough to fulfill the long-term business plans of its owners, given the fact that consumer broadband demand was increasing dramatically, and that SpectrumCo would have been a new entrant constructing a greenfield mobile wireless network intended to provide both voice and advanced data services.

36. Acquiring the spectrum was part of an effort by SpectrumCo's owners to explore wireless options for their customers.²⁶ In this analysis, I describe the steps required for a new entrant to build a greenfield 4G cellular system in the AWS band, and I describe SpectrumCo's efforts to perform those steps. The task facing a new entrant can be broken into three steps: (1) developing the spectrum; (2) provisioning the spectrum – the process of matching the available spectrum to customer demand; and (3) designing and constructing a greenfield network.

37. **Developing the Spectrum.** As is sometimes the case when the FCC reallocates a spectrum band, the AWS spectrum was in use by incumbent licensees at the time it was

²⁶ See Pick Declaration ¶ 2.

reallocated and auctioned. These incumbent licensees must be moved out of the band before the band can be repurposed by the successful bidders, but this process can only take place after licenses are issued for the auctioned spectrum. Prior to the AWS auction, the 2.1 GHz portion of the AWS paired allocation contained approximately 5700 fixed microwave service (FS) systems and 205 broadband radio service (BRS) systems. There also were myriad federal government users operating in the 1.7 GHz portion of the AWS paired allocation. Many of these federal government users are still in the AWS band. The rules for the AWS service call for a mandatory negotiation period of up to two years for non-public safety FS systems and up to three years for public safety FS systems.²⁷ Note that the need to identify, negotiate, and relocate incumbent users is critical to making the spectrum commercially usable, but adds to the time needed to start up a new system operating in the AWS spectrum. In fact, the FCC's rules provide AWS licensees an additional five years for construction beyond the license period that is typically provided to mobile wireless licensees because of the additional time it was anticipated to take to clear the band.²⁸

38. At the time that SpectrumCo acquired the AWS licenses in 2006, SpectrumCo created a template of a possible national network that it could create with the AWS spectrum. It then identified a number of incumbent microwave links that would need to be cleared in order to implement the template national network. SpectrumCo spent more than \$20 million to clear or

²⁷ See 47 C.F.R. §§ 27.1111, 27.1132, *et seq.*

²⁸ See *Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands*, Report and Order, 18 FCC Rcd 25162, ¶ 70 (2003) (The Commission established an initial license term of 15 years for licensees in the AWS-1 band, agreeing with commenters who argued that the need to clear the band and relocate incumbents warranted a longer-than-usual initial license term.).

confirm the clearance of more than 500 incumbent wireless point-to-point microwave links in the geographic area covered by SpectrumCo's AWS licenses.²⁹

39. **Provisioning the Spectrum.** After spectrum obtained at auction is cleared of incumbents, a licensee must determine how to use the spectrum based on a number of factors:

- (a) Is the new network to be used for voice, data, or both?
- (b) What are the issues associated with the frequency of the band? How is the maximum cell size determined, and what is the total number of cells required to be used to build out a system?
- (c) What air interface technology should be used? If voice is part of the wireless network, how is voice handled?
- (d) What are the current and projected amounts of data per customer?
- (e) What is the projected customer base for this new network?
- (f) For (a) through (e), what bandwidth of spectrum is expected to be required, what are the spectrum bandwidth projections for the future and how do we solve future bandwidth demands?

40. Consumer demand drives network development decisions, and, as noted in the Public Interest Statement,³⁰ consumer demand has shifted to broadband. From the plethora of data available in a number of recent reports from the FCC, Cisco, CTIA, and others³¹ it is clear that

²⁹ See Pick Declaration ¶ 3.

³⁰ See Verizon Wireless-SpectrumCo Application, FCC File No. 0004993617 (filed Dec. 16, 2011), Public Interest Statement at 7-9.

³¹ See, e.g., Federal Communications Commission, Connecting America: The National Broadband Plan, 2010, available at <http://www.broadband.gov/plan/>; Federal Communications Commission, "Mobile Broadband: The Benefits of Additional Spectrum", dated October 2010, available at http://transition.fcc.gov/Daily_Releases/Daily_Business/2010/db1021/DOC-302324A1.pdf; CISCO VISUAL NETWORKING INDEX: GLOBAL MOBILE DATA TRAFFIC FORECAST UPDATE, 2011–2016 (Feb. 14, 2012), available at http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.html.

data from smartphones, tablets, and dongles, as well as new applications³² for these types of devices, are driving the traffic on cellular networks today and will continue to do so into the foreseeable future. In order to support growth in broadband demand, a new entrant's greenfield wireless network must be engineered for optimal high-speed data transmission.

41. Each spectrum band is unique, and all of the characteristics of a band must be taken into account when designing a network. These factors include propagation characteristics, capacity, and availability of equipment and technology for the band. The AWS band was in its infancy at the time of the auction, and there were many unanswered questions about the spectrum and no off-the-shelf equipment available for use in the band.

42. In late 2006, when SpectrumCo acquired the AWS spectrum, there were several potential air interface technologies for the AWS band. The best way to determine which air interface technology is preferable is to test the available alternatives. Today, the answer is easy – the choice is LTE. The advances in LTE that have occurred since WiMAX was first introduced heavily favor LTE as the choice of technology. But just a few years ago, that “clear choice” was much less clear.

43. SpectrumCo began looking at 4G technologies that (a) could work in the AWS spectrum allocation, and (b) support broadband data. As a company which could only rely upon AWS spectrum (unlike the other major AWS auction winners, all of which were already operating using spectrum in other bands), SpectrumCo had to help drive the technology development in

³² Willa Plank, “Confessions of an iPhone Data Hog,” Wall Street Journal online (Jan. 27, 2012), available at <http://online.wsj.com/article/SB10001424052970204624204577183032028581306.html>; Marguerite Reardon, “Is Apple’s App Store a cellular data hog?,” CNET online (Sep. 26, 2011), available at http://news.cnet.com/8301-30686_3-20111803-266/is-apples-app-store-a-cellular-data-hog/.

this band. In January 2007, SpectrumCo embarked on a two-year study to determine the best possible air interface technology for deployment on a new nationwide 4G network operating in the AWS spectrum. At that time, AWS was in the very early stages of development, and there existed many questions about technology, equipment and how the spectrum could best be used. A 4G technology test bed was constructed and operated in King of Prussia, Pennsylvania by SpectrumCo to evaluate the three leading 4G technology candidates at that time: WiMAX, Ultra Mobile Broadband (UMB), and LTE. In 2007, this was a far-reaching undertaking because, although the standard for IEEE 802.16e TDD WiMAX had been approved in that year, the FDD version actually tested was a pre-standard technology. Similarly, 3GPP release 8, which defined the first LTE standard, was not completed until 2009. Leading wireless equipment manufacturers including Alcatel-Lucent, Qualcomm, and Huawei participated with SpectrumCo in the King of Prussia tests. The primary objectives of these tests were to evaluate and compare the performance of certain key attributes of the spectrum and the air interfaces, to determine the readiness of the technology for SpectrumCo deployment, to evaluate the applicability of the technology to the AWS spectrum, and to validate industry claims about the technology.

44. Each 4G technology was subjected to a set of live operational tests. Transmission equipment was installed at several outdoor cell sites, and the sites were connected to create a small-scale wireless network. Prototype handsets were tested with each 4G technology. The amount of time and resources devoted to the King of Prussia tests demonstrates that SpectrumCo was very serious about finding a way to use the AWS spectrum to provide wireless services to consumers.

45. For each 4G technology, SpectrumCo measured a number of key parameters essential to understanding the spectral efficiency, operational efficiency, latency, interference management, data throughput, and handover capability of the technology. For a variety of reasons (clear to everyone today), SpectrumCo determined that LTE was the optimal technology for use in the AWS spectrum. This conclusion was supported by both operational tests at the King of Prussia location and analysis conducted by SpectrumCo. Subsequent to the testing at King of Prussia, SpectrumCo collaborated with Nortel on LTE testing in the AWS band using Nortel's Ottawa Live Air Test system. In support of expanding the AWS ecosystem, SpectrumCo has also made its spectrum available to original equipment manufacturers to develop and test AWS-capable wireless equipment.

46. **Designing and Constructing a Greenfield Network.** Constructing a greenfield LTE network requires the selection of base station and wireless core network vendors. This equipment drives power requirements, space requirements, heating/cooling demands at the remote sites, and network communication requirements. After these vendors are selected, initial wireless network design may begin. Coverage areas are defined by market opportunity, demand, and population, with the goal of addressing all three aspects. With the initial wireless network plan completed, a backhaul plan to support communications to cell sites must be established. Often a backhaul plan consists of non-homogeneous backhaul methods – a mix of fiber/copper/microwave – in order to support a wide range of cell site locations.

47. Finally, before beginning operations, a new entrant must secure handsets and enter into roaming agreements. The key relevant questions for handsets are: which manufacturers will produce handsets for the relevant band, how long before handsets can be designed and delivered,

what is the total and subsidized cost of the handset, what up-front premiums must be paid to the manufacturer to offset its costs to develop the new handset, and when will chipsets become available to support the new frequency band? The standard method of introducing a new cellular system to interested consumers when the coverage provided by the new carrier is incomplete is by allowing the handset to roam to another mobile network operator in the local area. Thus, roaming agreements with other carriers in other bands using other interfaces must be negotiated, and the handsets provided by the new carrier must support the air interface and frequency requirements of the roaming operator.

[remainder of page intentionally left blank]


Conclusions

48. As explained above and for the reasons stated, I have concluded as follows:

- In light of the rapidly growing demand for mobile broadband, Verizon Wireless has used appropriate tools to project the demands that such use will increasingly place on its network;
- Verizon Wireless uses a reasonable and appropriate methodology to assess capacity constraints on its network in light of existing spectrum resources and has reasonably concluded that data traffic volumes will outstrip capacity in 2013 in some areas and in 2015 in many more, creating a need to acquire additional spectrum;
- Other methods for expanding network capacity – such as cell splitting, use of femto cells, offloading data traffic to WiFi networks, refarming existing spectrum, and deployment of LTE small cells – alone are insufficient to meet the projected demand;
- The alternative capacity-enhancing approaches suggested in petitions to deny, including software defined radios, mesh networking, channel bonding, use of unlicensed frequencies, and deployment of distributed antenna systems (DAS), are not viable solutions to address the increase in demand;
- SpectrumCo did everything a reasonably diligent new entrant AWS licensee might be expected to do within the first third of its license term and took meaningful steps to develop, use, and identify long-term business plans for the spectrum; and
- SpectrumCo reasonably determined that 20 MHz of AWS spectrum was not enough to fulfill the long-term business plans of its owners, given the fact that SpectrumCo would have been a new entrant constructing a greenfield mobile wireless network intended to provide both voice and advanced data services.

I, David E. Borth, declare under penalty of perjury that the foregoing declaration is true and correct to the best of my knowledge and belief.

Executed on March 2, 2012.



David E. Borth

February 2012

CV of DAVID E. BORTH

HOME ADDRESS

825 S. Harvard Dr.
Palatine, IL 60067
Tel. 847-359-0127
Email: dborth3@gmail.com
Cell: 847-624-1903

PERSONAL DATA

Date of Birth: June 17, 1952
Birthplace: Hinsdale, IL
Citizenship: U.S.A.

EDUCATION

University of Illinois at Urbana-Champaign, Urbana, Illinois

- 9/70-1/74 B.S. Degree in Electrical Engineering with Highest Honors, January 1974.
Advisor: Dr. Edward W. Ernst
- 1/74-6/75 M.S. Degree in Electrical Engineering, October 1975.
Major Field: Electromagnetic Theory and Bioengineering
Advisor: Dr. Charles A. Cain
- 8/77-9/79 Ph.D Degree in Electrical Engineering, October 1979
Major Field: Communication Theory
Advisor: Dr. Michael B. Pursley

EMPLOYMENT EXPERIENCE

UNIVERSITY OF ILLINOIS-CHICAGO

2012 to present

Professor, Department of Electrical and Computer Engineering

BORTH CONSULTING, LLC, Palatine, IL

2011 to present

Independent consultant to the wireless industry

MOTOROLA INC., Schaumburg, IL

1980 to 2010

\$21.7B international telecommunications equipment provider.

Corporate VP, CTO and Director of Advanced Technology and Research and Emerging Business Office, Enterprise Mobility Solutions (EMS) (2005 - 2010)

Directed advanced technology initiatives impacting government and public safety business as well as new business opportunities in the enterprise space. Played key role as company spokesperson in various trade/government venues in the advanced wireless technology industry. Established technology strategy for government, public safety, and enterprise business. Technologies include wireless broadband (LTE/WiMAX), RF circuits and ICs, security including IA and encryption, communication network architecture, multimedia. Supervised 215 employees in 5 locations across 3 countries.

- Initiated the creation of technology that spawned two new businesses within the EMS organization, the LTE Private Broadband business and the Interoperable Solutions business which will become the cornerstone of the future of the entire EMS organization going forward.
- Initiated the development of the software defined radio platform and corresponding custom integrated circuits which will be used in all of the EMS subscriber radios going forward resulting in projections of significant cost reductions and reduction in inventory.
- Developed a Mission Critical Bluetooth device and security protocols that resulted in the use of existing Bluetooth devices and accessories to be used with public safety radio in a secure manner.
- Achieved FCC ruling in 2010 supporting a new “super WiFi” service based on the reuse of analog TV spectrum by unlicensed access points through the development of the necessary technology and successful demonstration of prototype devices to the FCC in 2007.
- Created the protocols and signal processing methods required to implement the next generation of public safety radios that achieved compliance with FCC mandates after 2011 and led the industry in standardization of these protocols.

Corporate VP and Director, Wireless Access Research, Motorola Labs (2001 - 2005)

Led multi-site, multinational R&D organization focused on advanced communication systems and technologies in the area of wireless access, including mesh/ad hoc, WLAN, sensor/control, 2.5G+and 3.5G, MIMO and OFDM systems. Supported wireless businesses within Motorola with the organization receiving ~30-65 patents/year, generating 125+ standards contributions and ~100+ publications/year. Oversaw 13 labs employing 250+ engineers in the US, France, Australia, Japan and the UK. Managed \$35M+ R&D budget, additionally receiving \$8.5M in external and incubator funding from NIST, DARPA and the European 5th and 6th Framework programs.

- Launched the WiMax product organization through the creation of the necessary technology that resulted in a \$600M/year business. IPR created valued at “several hundred million dollars”.
- Created the technology for EDGE products for both of Motorola’s cellular businesses that resulted in shipment of 30+ million devices per quarter incorporating this technology.

- Developed a video processing technology and hardware architecture which enabled video cameras to be incorporated into cell phones.
- Created a new low-power wireless protocol and corresponding hardware architecture suitable for wireless sensor networks that resulted in this protocol, now known as ZigBee, to be the basis for all of today's smart grid meter reading systems.

VP and Director, Communication Systems and Technologies Labs, Motorola Labs (1998 - 2001)

- Oversaw 13 labs employing 250+ engineers in the US, France, Australia, Japan and the UK. Managed \$35M+ R&D budget, ~\$2.5M in external funding (from the European Union's 5th and 6th Framework Programs), \$1M in U.S. government funding (from various agencies, including NIST, DARPA and others) and ~\$5M in internal incubator funding..
- Developed WAP, a new protocol that permitted cell phones to browse the Internet for the first time, and built the initial prototype that was subsequently included on all cell phones.

VP and Director, Corporate Communication Systems Labs, Corporate R&D (1996 - 1998)

- Initiated work on a true personal communications system using microcell technology. Designs were transferred to a new business – CableComm – and were used to implement Motorola's first cable modem and cable telephony business prior to the acquisition of General instruments in 2001. These same designs were used also in creating Motorola's GPRS proposal.
- Created the Paris Research lab in 1996

Manager, Communication Systems Research Lab, Corp. R&D (1990 - 1996)

- Initiated the study of CDMA technology that resulted in a partnership between Motorola and Qualcomm beginning in 1992. Worked on signal processing algorithms used in Motorola's initial implementation of IS-95 – the CDMA air interface standard. Created a team that developed enhancements to Qualcomm's technology that eventually were adopted in the 1xEVDO.

Technical Staff Member, Systems Research Lab (1980 - 1990)

- Developed entire signal processing and control architecture for Motorola's first GSM system implementations. Designed initial link systems, validation systems and the world's first type-accepted GSM mobile system (in 1991) with the signal processing algorithms still actively employed in all GSM subscriber products and in 1.1B+ GSM phones. Up until approximately 2006, Motorola was selling approximately 45 million handsets per quarter of which more than 75% were GSM phones using this technology. Licensing of patents from this technology development resulted in hundreds of millions of dollars to Motorola.
- Developed the algorithms and led the team that initiated the first Motorola implementation of IS-54 – the U.S. TDMA digital cellular standard. All algorithms

were adopted by the product organizations leading to early roll-out of both base and subscriber TDMA equipment.

- Helped create Motorola's first voice recognition cellular phone to permit truly-hands-free dialing.
- Helped Motorola enter the DSP marketplace via development of algorithms and application notes for the DSP56001.

July 1983 - 1986

Department of Electrical Engineering & Computer Science
University of Illinois at Chicago
Chicago, IL
Adjunct Assistant Professor
Supervised 5 M.S.E.E Projects

September 1979-June 1980:

School of Electrical Engineering,
Georgia Institute of Technology,
Atlanta, GA
Assistant Professor

August 1977 - August 1979:

Coordinated Science Laboratory,
University of Illinois, Urbana, IL
Research Assistant in Communication Theory

June 1975 - July 1977:

Watkins-Johnson Company, Palo Alto, CA
Member of the Technical Staff

PROFESSIONAL REGISTRATION, LICENSES AND CLEARANCES

Registered Professional Engineer, State of Illinois, No. 062-040218

FCC General Radiotelephone Operator License, No. PG-6-12362

Amateur Radio License, Extra Class N9KYZ

DoD Secret Clearance

FELLOWSHIPS & AWARDS

- Elected to National Academy of Engineering, 2004

- Fellow (1997), Institute of Electrical and Electronics Engineers (member 1970 - present)
- Motorola Regional Patent of the Year Award, Motorola Labs, 2001, U.S. Patent 4,852,090
- Distinguished Alumnus Award from the University of Illinois Electrical and Computer Engineering Alumni Association, Urbana, IL, September 1995
- Recipient of 1995 Master Innovator Award from Motorola (25 or more issued patents)
- Recipient of 1992 Distinguished Innovator Award from Motorola (10 or more issued patents)
- Elected Motorola Dan Noble Fellow 1990 (Highest technical award of Motorola Inc.)
- Elected member of Motorola Science Advisory Board Associates (SABA) 1989

University of Illinois Fellow

University of Illinois 1977-1978

National Institutes of Health Fellowship

University of Illinois 1975

Bronze Tablet

University of Illinois 1974

Outstanding Senior Award, Eta Kappa Nu

University of Illinois 1974

Edmund J. James Scholar

University of Illinois 1970-1973

Honorary Societies: Phi Eta Sigma, Tau Beta Pi, Eta Kappa Nu, Phi Kappa Phi

THESES

M.S.: The Generation of Acoustic Signals in Materials by Irradiation with Microwave Pulses, August 1975.

Ph.D.: Performance Analysis of Direct-Sequence Spread-Spectrum Multiple-Access Communication via Fading Channels, September 1979. Dissertation abstract appears in **IEEE Transactions on Information Theory**, vol. IT-26, pp. 508-509, July 1980.

JOURNAL AND CONFERENCE PAPERS

1. D. Borth, R. Ekl, B. Oberlies, and S. Overby, "Considerations for Successful Cognitive Radio Systems in US TV White Space," *New Frontiers in Dynamic Spectrum Access Networks, 2008 (DySPAN 2008)*, pp. 1-5, Chicago, IL, USA, October 14-17, 2008.
2. D. E. Borth, P. D. Rasky, G. M. Chiasson, and J. F. Kepler, "Frequency Hopped Systems for PCS," *Proceedings of the 1994 IEEE International Symposium on*

- Spread Spectrum Theory and Applications*, pp. 105-114, Oulu, Finland, July 4-6, 1994.
3. P. D. Rasky, G. M. Chiasson, D. E. Borth, and R. L. Peterson, "Slow frequency-hop TDMA/CDMA for macrocellular personal communication systems," *IEEE Personal Communications*, vol. 1, pp. 26-35, Second Quarter, 1994. Reprinted in *Cellular Radio & Personal Communications*, vol. 2, *Advanced Selected Readings*, T. S. Rappaport, ed. Piscataway, NJ: IEEE Press, 1996.
 4. Phillip D. Rasky, Greg M. Chiasson and David E. Borth, "Hybrid Slow Frequency-Hop/CDMA-TDMA as a Solution for High-Mobility, Wide-Area Personal Communications," *Proceedings of the Fourth Winlab Workshop on Third Generation Wireless Information Networks*, pp. 199-215, East Brunswick, New Jersey, October 19-20, 1993.
 5. Phillip D. Rasky, Greg M. Chiasson, and David E. Borth, "An Experimental Slow Frequency-Hopped Personal Communication System for the Proposed U.S. 1850-1990 MHz Band," *Proceedings of the Second International Conference on Universal Personal Communications*, pp. 931-935, Ottawa, Canada, October 12-15, 1993.
 6. Phillip D. Rasky, Greg M. Chiasson and David E. Borth, "Slow Frequency-Hopped CDMA for High-Mobility Personal Communication Systems," (Invited Paper) *Proceedings of the Thirty-First Annual Allerton Conference on Communication, Control, and Computing*, pp. 325-334, Monticello, Illinois, September 29-October 1, 1993.
 7. Kevin L. Baum, David E. Borth, and Bruce D. Mueller, "A Comparison of Nonlinear Equalization Methods for the U.S. Digital Cellular System," *Proceedings of the 1992 International Conference on Communications*, pp. 312.1.1-312.1.5, June 15-17, 1992.
 8. Joseph M. Nowack, David E. Borth, and Phillip D. Rasky, "Soft-Output MLSE Equalization Methods for the Mobile Radio Channel," (Invited Paper) *Proceedings of the Twenty-Ninth Annual Allerton Conference on Communication, Control, and Computing*, pp. 11-20, October 2-4, 1991.
 9. David E. Borth and Phillip D. Rasky, "Signal Processing Aspects of Motorola's Pan European Digital Cellular Validation Mobile," (Invited Paper) *Proceedings of the 1991 IEEE International Phoenix Conference on Computers and Communications*, pp. 416-423, March 27-30, 1991.
 10. John R. Haug, David E. Borth, Kevin L. Kloker, and Carol W. Wu, "A DSP-Based Stereo Decoder for Automotive Radio," *Proceedings of the 1990 SAE International Congress and Exposition*, paper 900244, Detroit, MI, February 27, 1990.
 11. David E. Borth and Phillip D. Rasky, "An Experimental RF Link System to Permit Evaluation of the GSM Air Interface Standard," *Proceedings of the Third Nordic Seminar on Digital Land Mobile Radio Communication*, paper 6.3, Copenhagen, Denmark, September 12-15, 1988.
 12. David E. Borth, Ira A. Gerson, John R. Haug, Charles D. Thompson, "A Flexible Adaptive FIR Filter VLSI IC," *IEEE Journal on Selected Areas in Communications*, vol. SAC-6, pp. 494-503, April 1988.

13. David E. Borth, Ira A. Gerson, and John R. Haug, "A Cascadable Adaptive FIR Filter VLSI IC," *Proceedings of the 1987 IEEE International Conference on Acoustics, Speech, and Signal Processing*, pp. 13.11.1-13.11.4, Dallas, TX, April 1987.

14. David E. Borth, Michael J. McLaughlin, and James J. Mikulski, "Implementation of a Digital Mobile Radio Incorporating Combined Modulation/Coding," *Proceedings of the Second Nordic Seminar on Digital Land Mobile Radio Communication*, pp. 85-89, Stockholm, Sweden, October 14-16, 1986.
15. David E. Borth, "Digital Signal Processing Estimates for Two Digital Time-Division Multiple Access Methods," *Proceedings of the CEPT/GSM Workshop on VLSI Requirements for the Pan-European Cellular Radio System*, September 25-26, 1986.
16. Zohar Raz and David E. Borth, "A Digital Signal Processing Approach to Multichannel Television Sound Decoding," *IEEE Transactions on Consumer Electronics*, vol. CE-32, pp. 453-462, August 1986.
17. Zohar Raz and David E. Borth, "Digital MTS System," *Proceedings of the 1986 IEEE International Conference on Consumer Electronics*, session VII, pp. 98-99, Rosemont, IL, June 4-6, 1986.
18. David E. Borth, "Modified Phase-Shift Keying -- A New Line Code for Digital Subscriber Loops," *Electronics Letters*, vol. 22, no. 5, pp. 243-245, February 27, 1986.
19. Richard A. Comroe and David E. Borth, "Digital Subscriber Loop Synchronization Technique," *Motorola Technical Developments*, vol. 3, pp. 27-28, March 1983.
20. D. E. Borth, M. B. Pursley, D. V. Sarwate, and W. E. Stark, "Bounds on Error Probability for Direct-Sequence Spread-Spectrum Multiple-Access Communications" *1979 MIDCON Conference Proceedings*, pp. 15/1-1--15/1-14, November 1979.
21. D. E. Borth, "Quadriphase Direct-Sequence Spread-Spectrum Multiple-Access Communication via Fading Channels," *Proceedings of the Seventeenth Annual Allerton Conference on Communication, Control, and Computing*, pp. 112-121, October 1979.
22. D. E. Borth and M. B. Pursley, "Analysis of Direct-Sequence Spread-Spectrum Multiple-Access Communication over Rician Fading Channels," *IEEE Transactions on Communications*, vol. COM-27, pp. 1566-1577, October 1979.
23. D. E. Borth and M. B. Pursley, "Spread-Spectrum Communication via Fading Channels," *Abstracts of the 1979 IEEE International Symposium on Information Theory*, Grignano, Italy, p. 22, June 25-29, 1979.
24. D. E. Borth and M. B. Pursley, "Direct-Sequence Spread-Spectrum Multiple-Access Communication for a Class of Rician Fading Channels," *Proceedings of the National Telecommunications Conference*, vol. 3, pp. 35.2.1-35.2.6, December 1978.
25. D. E. Borth and C. A. Cain, "Theoretical Analysis of Acoustic Signal Generation in Materials Irradiated with Microwave Energy," *IEEE Transactions on Microwave Theory and Techniques*, vol. MTT-25, pp. 944-954, November 1977.

26. D. E. Borth and C. A. Cain, "The Microwave Hearing Effect--A Theoretical Analysis," *Abstracts of the USNC/URSI Meeting*, University of Illinois, Urbana, Illinois, p. 103, June 3-5, 1975.
27. D. E. Borth and C. A. Cain, "The Generation of Acoustic Signals in Materials Irradiated with Microwave Pulses," *Proceedings of the Microwave Power Symposium 1975*, University of Waterloo, Waterloo, Ontario, Canada, pp. 95-98, May 28-30, 1975.

BOOKS

"Hybrid Slow Frequency-Hop/CDMA-TDMA as a Solution for High-Mobility, Wide-Area Personal Communications," Phillip D. Rasky, Greg M. Chiasson, and David E. Borth, in **Wireless and Mobile Communications**, Jack M. Holtzman and David J. Goodman, editors. Boston: Kluwer Academic Publishers, 1994.

"Frequency Hopped Systems for PCS," D. E. Borth, P. D. Rasky, G. M. Chiasson, and J. F. Kepler, in **Code Division Multiple Access Communications**, S. Glisic and Lappenen, editors. Boston: Kluwer Academic Publishers, 1995.

"An Overview of Personal Communication Systems," David E. Borth, in **Microsystems Technology for Multimedia Application: An Introduction**, Bing Sheu, Mohammed Ismail, Edgar Sanchez-Sinencio, editors. New York: IEEE Press, 1995.

Roger L. Peterson, Rodger E. Ziemer, and David E. Borth, **Introduction to Spread-Spectrum Communications**. Englewood Cliffs, NJ: Prentice-Hall, 1995. Translated into Japanese and republished in Japan in 2002 by Science & Technology Press, Inc.

David E. Borth, "The Telephone," **Encyclopaedia Britannica**, 1997. Updated 2002.

David E. Borth, James S. Lehnert, Wayne S. Stark, "Principles of Telecommunications," **Encyclopaedia Britannica**, 1997.

ISSUED U.S. PATENTS (113 Patents Worldwide)

1. U. S. Patent 4,628,529, "Improved Noise Suppression System," December 9, 1986, David E. Borth, Ira A. Gerson, and Richard A. Vilmur, (disclosed as CM00234H).
2. U. S. Patent 4,630,304, "Automatic Background Noise Estimator for a Noise Suppression System," December 16, 1986, David E. Borth, Ira A. Gerson, and Richard A. Vilmur, (disclosed as CM00143H).
3. U. S. Patent 4,630,305, "Automatic Gain Selector for a Noise Suppression System," December 16, 1986, David E. Borth, Ira A. Gerson, Philip J. Smanski, and Richard A. Vilmur, (disclosed as CM00235H).

4. U. S. Patent 4,723,288, "Stereo Decoding by Direct Time Sampling," February 2, 1988, David E. Borth, Kevin L. Kloker, and James J. Mikulski, (disclosed as SC-05624A).
5. U. S. Patent 4,737,976, "Hands-Free Control System for a Radiotelephone," April 12, 1988, David E. Borth, Ira A. Gerson, and Richard A. Vilmur, (disclosed as CM00156H).
6. U. S. Patent 4,775,851, "Multiplierless Decimating Low-Pass Filter Circuit For a Noise-Shaping A/D Converter," October 4, 1988, David E. Borth, (disclosed as CM00356H).
7. U. S. Patent 4,829,543, "Phase-Coherent TDMA Quadrature Receiver for Multipath Fading Channels," David E. Borth, Chih-Fei Wang, Duane C. Rabe, and Gerald P. Labedz, May 9, 1989, (disclosed as CE00398H).
8. U.S. Patent 4,847,869, "Rapid Reference Acquisition and Phase Error Compensation for Radio Transmission of Data," July 11, 1989, Gerald P. Labedz and David E. Borth, (disclosed as CM00368H).
9. U. S. Patent 4,852,090, "TDMA Communications System with Adaptive Equalization," July 25, 1989, David E. Borth, (disclosed as CM00334H).
10. U. S. Patent 4,876,683, "TDMA Radio System Employing BPSK Synchronization for QPSK Signals Subject to Random Phase Variation and Multipath Fading," October 10, 1989, David E. Borth, Chih-Fei Wang, Duane C. Rabe, and Gerald P. Labedz, (disclosed as CE00027R).
11. U. S. Patent 4,887,050, "Frequency Control Apparatus and Method for a Digital Radio Receiver," December 12, 1989, David E. Borth and James F. Kepler, (disclosed as CE00158R).
12. U. S. Patent 4,910,470, "Digital Automatic Frequency Control of Pure Sine Waves," March 20, 1990, David E. Borth and James F. M. Kepler, (disclosed as CE00130R).
13. U.S. Patent 5,121,412, "All-Digital Quadrature Modulator," June 9, 1992, David E. Borth, (disclosed as CM00451H).
14. U.S. Patent 5,133,010, "Method and Apparatus for Synthesizing Speech Without Voicing or Pitch Information," David E. Borth, Ira A. Gerson, Richard J. Vilmur, and Brett L. Lindsley, July 21, 1992 (disclosed as CM00249G).
15. U.S. Patent 5,142,551, "Signal Weighting System for Digital Receiver," August 25, 1992, David E. Borth, Phillip D. Rasky, Fuyun Ling and M. Vedat Eyuboglu (disclosed as CE00399R).
16. U. S. Patent 5,144,644, "Soft Trellis Decoding," September 1, 1992, David E. Borth, (disclosed as CE02086R).
17. U.S. Patent 5,214,675, "System and Method for Calculating Channel Gain and Noise Variance of a Communication Channel," May 25, 1993 Bruce D. Mueller, Kevin L. Baum, David E. Borth, Phillip D. Rasky, and Eric H. Winter (filed as CE-00409R).

18. U. S. Patent 5,233,632, "Communication System Receiver Apparatus and Method for Fast Carrier Acquisition," August 3, 1993, Kevin L. Baum, David E. Borth, and Phillip D. Rasky (filed as CM-0731H).
19. U.S. Patent 5,263,052, "Viterbi Equalizer for Radio Receiver," November 16, 1993, David E. Borth, Bruce D. Mueller and Kevin L. Baum, (disclosed as CE-00512R).
20. U. S. Patent 5,271,042, "Soft Decision Decoding with Channel Equalization," December 14, 1993, David E. Borth, Gerald P. Labedz, and Phillip D. Rasky, (disclosed as CE-02049R).
21. U. S. Patent 5,276,685, "Digital Automatic Gain Control," January 4, 1994, James F. M. Kepler, David E. Borth, and Frank J. Cerny, (disclosed as CE-121R).
22. U. S. Patent 5,301,364, "Method and Apparatus for Digital Automatic Gain Control in a Receiver," April 5, 1994, John W. Arens, David E. Borth, and James F. M. Kepler (disclosed as CE0332R).
23. U.S. Patent No. 5,379,324, Continuation in part of "Soft Decision Decoding for Fading Radio Channels Incorporating Pi/4 DQPSK," January 3, 1995, Bruce D. Mueller, Kevin L. Baum, David E. Borth, Phillip D. Rasky, and Eric H. Winter (disclosed as CE0409RD1 (June 25, 1991)).
24. U. S. Patent 5,381,443 "Method and Apparatus for Frequency Hopping a Signalling Channel in a Communication System," January 10, 1995, David E. Borth, John R. Haug, and Phillip D. Rasky (disclosed as CE-02376R (April 16, 1992))
25. U. S. Patent 5,392,300 "A Dual Mode Radio Communication Unit," February 21, 1995, David E. Borth, John R. Haug, Phillip D. Rasky, and Greg M. Chiasson (disclosed as CE-2370R) (April 16, 1992))
26. European Patent EP-B1-0373405 "AFC on Data", December 1995, David E. Borth, James F. Kepler (disclosed as CE00124R).
27. U. S. Patent 5,574,973, "Method of Registering/Reassigning a Call in a Dual Mode Communication Network, November 12, 1996, David E. Borth, John R. Haug, and Phillip D. Rasky.
28. United States Patent 5,712,868, "Dual mode communication network," January 27, 1998, Morton Stern, John S. Csapo, David Edward Borth, Charles N. Lynk, Jr., John Richard Haug, Eric R. Schorman, Phillip David Rasky, Walter Joseph Rozanski, Jr (filed June 30, 1992)
29. U.S. Patent 5,737,327, "Method and Apparatus for Demodulation and Power Control Bit Detection in a Spread Spectrum Communication System," April 7, 1998, Fuyun Ling, David E. Borth, Colin D. Frank, Phillip D. Rasky, James F. Kepler.

30. U.S. Patent 5,878,324, "Method & System for Distribution of Wireless Digital Multi-Media Signals in a Cellular Pattern," March 21, 1999, David E. Borth, John Major, William Braun, James J. Mikulski.

31. U.S. Patent 6,111,923, "System and Method for Calculating a State Transition Metric in a Viterbi Equalizer," August 29, 2000, Bruce D. Mueller, David E. Borth, Kevin L. Baum.

IEEE ACTIVITIES

- Member of Technical Program Committee, ICC'85 (COMSOC)
- Session Chairman and Organizer, IEEE 1985 International Conference on Communications, June 1985.
- Chairman and session organizer, ICC'92 (COMSOC)
- Presented a one-hour tutorial on Personal Communication Systems at IEEE ISCAS'95 (Circuits and Systems Society)
- Member of the Technical Program Committee, VTC'95 (VTS)
- Member of the Technical Program Committee, 1996 International Symposium on Spread Spectrum Theory and Applications (ISSSTA'96) (COMSOC)
- IEEE Paper Reviewer, October 1979 - present: Reviewed papers submitted to IEEE Transactions on Communications, IEEE Transactions on Vehicular Technology, and IEEE Transactions on Education and associated conferences
- Member, Communication Theory Committee, IEEE Communications Society, 1989 -.
- Finance Chair, 2003 IEEE Wireless Communications and Networking Conference, March 16-20, 2003.

NATIONAL RESEARCH COUNCIL ACTIVITIES

- Peer review committee, National Academy of Engineering, 2010-2013
- National Academies Panel on Digitization and Communications Science review of the Army Research Laboratory (ARL) in Adelphi, MD. 2009-2010, 2011-2012
- Review of NRC Report "Toward a Universal Radio Frequency System for Special Operations Forces," 2009. (Note that this report is Exempt for Mandatory Disclosure under the Freedom of Information Act, 5 U.S.C. 552(b).)
- Wireless Technology Prospects and Policy Options Panel sponsored by the Computer Science and Telecommunications Board. 2003-present
- National Research Council Board on Laboratory Assessments, Panel on Electronics and Electrical Engineering, Review of Electronics and Electrical Engineering Laboratory of the National Institute of Standards and Technology (NIST), 2007, 2009.
- Review of NRC report Rising to the Situation: IT-Enabled Transformation of Disaster Management, September 20, 2006 (forthcoming NRC report)

- Review of NRC report Science and Technology to Counter Terrorism -The Proceedings of an Indo-U.S. Workshop, September 6, 2006 (NRC report released March 2007)
- Review of Computer Science and Telecommunications Board – June 2006
- NRC Naval Studies Board: Reviewer: 2003
- NRC Committee on Science and Technology for Countering Terrorism: Panel on Information Technology (Branscomb-Klausner Report): 2001-2002. This panel produced the two reports: “Making the Nation Safer – The Role of Science and technology in Countering Terrorism,” (National Academies Press, 2002) and “Information Technology for Counterterrorism: Immediate Actions and Future Possibilities,” (National Academies Press, 2003).
- NRC Computer Science and Telecommunications Board (CSTB): 2000-2003. Reviewed numerous reports and studies during this period.

OTHER BOARDS AND COMMITTEES

- U.S. Department of Commerce Spectrum Management Advisory Committee (chaired successively by John Kneuer, Meredith Baker and Larry Stickling head of NTIA and Assistant Secretary of Commerce for Communications and Information), Special Government Employee appointed by U.S. Commerce Secretary Carlos M. Gutierrez: 2006-present
- Federal Communications Commission Technological Advisory Committee, 2005-2006
 - National Science Foundation: Committee of Visitors, 2000
 - University of Illinois at Urbana-Champaign: Director of the Motorola Center for Communications. 1999-2005
 - Midwest vice president of the Electrical and Computer Engineering Alumni Association of the University of Illinois 2001-2004.
 - Northwestern University: member of the board of directors of the Northwestern Center for Telecommunications, 1999-2002
 - University of Michigan: member of the National Advisory Council of the Department of Electrical Engineering and Computer Science, 1999-2002
 - Wireless World Research Forum (an international forum of 60+ companies/institutions focusing on wireless communications beyond 3G (B3G)): Vice Chairman and Founding Member 2001-2003

EXTERNAL PRESENTATIONS –A PARTIAL LIST

1. “Next Generation Public Safety (Keynote address)”, Motorola EMS North America 2010 Consultant Seminar - Day 2 Keynote, May 20, 2010.

2. "Next Generation Public Safety Communications," to the U.S. National Security Agency, 140 National Business Parkway Annapolis Jct, MD 20701 , April 1, 2010.
3. "Next Generation Public Safety (Keynote address)," APCO Australasia Conference, Melbourne, Australia, March 15, 2010.
4. "Next Generation Public Safety Communications – Progress, Challenges and Future," to the Office of Emergency Communications, Department of Homeland Security, Washington, DC, February 28, 2010.
5. Motorola Briefing to Electronic Warfare Technology Task Force Workshop, Naval Research Lab, December 9, 2009.
6. "FCC Broadband Taskforce Research Recommendations Workshop, (Invited speaker)" FCC, Washington, DC November 23, 2009.
7. Motorola Briefing on Smart Grid and Smart Grid Security to DTE Energy CIO (Lynne Ellyn), Detroit, MI, November 11, 2009.
8. "LTE and Public Safety," to FCC Public Safety and Homeland Security Bureau Chief Jamie Barnett, Washington, DC, October 27, 2009.
9. Smart Grid Panel, CTIA Wireless IT and Entertainment Conference, San Diego, CA, October 8, 2009.
10. "Motorola Comments on Smart Chicago Proposal," City of Chicago, IL, July 27, 2009.
11. "Broadband Wireless Networks for Public Safety," to FCC Department of Public Safety and Homeland Security, Washington, DC, June 25, 2009.
12. "Motorola Technology Solutions for Public Safety," Colombia National Police and Military Symposium, Bogota, Colombia, April 29, 2009.
13. "Cognitive Radio: Current Status and Future Technology Challenges at Motorola (invited Speaker)," University of Colorado Electrical and Computer Engineering department, Boulder, CO, February 25, 2009.
14. "Cognitive Radio: Current Status and Future Technology Challenges at Motorola, (Keynote Speech)" DySPAN 2008, Chicago IL, October 16, 2008
15. "Motorola R&D for Public Safety," to New York Police Department Commissioner, September 24, 2008.
16. "Advanced Technology for Government and Public Safety," to Los Angeles CTO Randi Levin, Los Angeles, CA July 8, 2008.
17. "Convergence = Experience: Taking the Internet Airborne," to Ontario Provincial Government CIOs, Toronto, Ontario, Canada, June 11, 2008.
18. "New Technology for NYPD," to New York Police Department Commissioner, May 8, 2008.
19. "Motorola Technology Overview and Advanced Technology for Government And Public Safety," presentation to Airwave, Schaumburg, IL December 4, 2007.
20. "Emergency Communications – Part 2," presentation to FCC on Emergency Communications, October 2, 2007.
21. Texas Wireless Summit, Austin, TX, September 27, 2006. Panel discussion/presentation on Telecommunications R&D, made at the request of Tom Meredith, of Motorola's Board of Directors.

22. Korean Ministry of Communications and ETRI – Presentation on new advances in wireless communications including WiMAX and Mesh, Washington, DC July 21, 2006.
23. “WiMAX, Broadband Wireless and Future Radio Technology” FCC Technological Advisory Council, FCC Headquarters, Washington, DC, July 20, 2006.
24. “Improving Operations through Technology – Seamless Mobility for Government,” Miami-Dade County, March 2, 2006.
25. Presentation to Illinois US Senate/House Staff on Motorola’s capabilities for Homeland Security. Part of “Highlighting Homeland Security Private Sector Capabilities and Public-Private Partnerships in the State of Illinois” symposium, 345 Cannon House Office building, Washington, DC February 28, 2006.
26. NTIA/Industry Canada Visit: Overview of Communications Research in Motorola and Greenhouse 2/Atlas + Mesh demonstration – Schaumburg, February 24, 2006 (Note: Industry Canada is the equivalent of the FCC in Canada)
27. Office of the Vice President: One-on-one meeting with Ramsen Betfarhad, Deputy Assistant to the Vice President for Domestic Policy, Old Executive Office Bldg., Rm. 286, 17th & Penn re: R&D for Telecommunications, December 6, 2005.
28. “A future Vision for Interoperable Homeland Security Communications,” presentation to the Office of Management and Budget, Washington, DC, October 26, 2005.
29. “Wireless Systems – Current and Future Challenges,” University of Illinois-Chicago, August 30, 2005 (see Web broadcast - http://www.uic.edu/depts/enga/coe_media/pmc.htm <http://realmedia.uic.edu/ramgen/depts/engr/ems/seminars/DavidBorth.rm>)
30. “A View of the Telecommunications Future,” to FCC Chairman Kevin Martin, CSPP Workshop, Jackson Hole, WY, June 23, 2005.
31. “Shared Spectrum Challenges,” IEEE 2005 Wireless Communications and Networking Conference (WCNC), New Orleans, LA, April 2005 (Panel sponsored by Ed Thomas, Chief Engineer, FCC).
32. “Future Directions for Wireless Technology,” 2005 Vodafone Wireless Technology Symposium (with Auburn University, University of California-Berkeley and University of Illinois at Urbana-Champaign), Urbana, IL, April 9, 2005.
33. Wireless Systems, Current and Future Challenges, Purdue University, West Lafayette, IN, February 10, 2005.
34. “The Need for Increased Federal Funding of Telecommunications Research,” to various committees of the U.S. House and Senate, Telecommunications Industry Association (TIA), February 1, 2005.
35. “Radio Access Network: Technology Evolution”, Motorola-China Technology Symposium, November 19, 2004, Beijing, China.
36. “Overview of Motorola Technologies,” to Ed Thomas, Head, Office of Engineering and Technology, Federal Communications Commission, September 28, 2004, Schaumburg, IL.
37. “Overview of Mobile Broadband Wireless Access Technologies,” 2004 Motorola Financial Analyst Meeting, July 27, 2004, Rosemont, IL.

38. "Towards More Flexible Mobile Communication Systems", invited plenary presentation, Wireless World Research Forum, February 26, 2004, Beijing, China.
39. "Overview of Wireless Broadband Technology", invited presentation, Beijing University of Technology, February 26, 2004, Beijing, China.
40. "Overview of Motorola Technologies," to China Ministry of Science and Technology delegation, December 11, 2003, Schaumburg, IL.
41. "Advances in Wireless Technology," National Telecommunications and Information Administration (NTIA) Panel on Spectrum Efficiency and New Technology, Department of Commerce, December 9, 2003, Washington, DC.
42. Motorola Labs Technology, Beijing University of Post and Telecommunications, November 20, 2003, Beijing, China.
43. "Research Overview on Broadband Wireless and Network Technology Beyond 3G," to KDDI Labs, September 4, 2003, Kamifukuoka, Tokyo, Japan.
44. "Performance Comparison of Direct Sequence and OFDM Ultra Wideband Technologies," to Ed Thomas, Head, Office of Engineering and Technology, Federal Communications Commission, August 20, 2003, FCC, Washington, DC.
45. "Advanced Wireless Technology," to Michael Powell, Chairman, Federal Communications Commission, June 10, 2003, Schaumburg, IL.
46. "Fourth Generation Mobile Broadband Systems," invited talk, NTT DoCoMo 4G Forum, October 22, 2002, Yokuska Research Park, Japan.
47. "Spectrum Policy White Paper," to Paul Kolodzy, FCC, September 13, 2002, Washington, DC.
48. "The Future of Wireless" Progress and Freedom Foundation Summit, August 19, 2002, Aspen, CO.
49. "Motorola Technology and the Navy," to Admiral Ann Rondeau of the Great Lakes Naval Training Center, July 2, 2002, Schaumburg, IL.
50. "Future of Wireless Technology," Wireless Congress, May 29, 2002, San Francisco, CA.
51. "Wireless Broadband Communications" CSPP Meeting to all of the department heads of the FCC (Bob Pepper, Paul Kolodzy, Ed Thomas, et al.), May 23, 2002, Washington, DC.
52. "Wireless Research and Funding," Computer Science and Telecommunications Board, May 21, 2002, Johnsen Center, National Academy of Sciences, Woods Hole, MA. (Note: This initiated the discussion that led to the NRC Project "Telecommunications Research and Development" under the direction of Robert Lucky)
53. "Advances in Mobile Broadband Technology", to Paul Kolodzy, Sr. Spectrum Policy Advisor FCC/DARPA, May 15, 2002, Schaumburg, IL.
54. "The Future of Wireless – A Motorola Labs Perspective " EECS Department, MIT, April 29, 2002, Cambridge, MA
55. "A View of Next Generation Wireless Technologies for Personal Communication Systems," Invited Plenary, 1998 NSF/DARPA/NASA/ONR Workshop on Wireless Technologies and Information Networks, Arlie House, Warrenton, VA, July 23-24, 1998.
56. "Channel Equalization for Land Mobile Radio," 1992 UCLA Electrical Engineering Symposium in Technologies for Personal Communications, UCLA, February 3, 1992.

INTERNAL REPORTS

1. David Borth, "Transform Modulation," August 28, 1980.
2. David Borth, "A Critical Review of Transform Modulation," November 26, 1980.
3. David Borth and Ira Gerson, "Use of the Forward-Backward Algorithm in Speech Recognition Systems Employing Markov Models of Speech," March 27, 1981.
4. David Borth, "Speech Recognition using the Viterbi Algorithm," October 1, 1981.
5. David Borth, "A Comparison of Gaussian MSK and Motorola's Reduced Deviation FSK System," January 11, 1982.
6. David Borth, "Notes on Bell Labs's Frequency-Hopped Spread-Spectrum System," February 4, 1982.
7. David Borth, "Spectrum Efficiency and Compatibility of Spread-Spectrum Systems," February 8, 1982.
8. David Borth, "Use of the WAL2 Line Code as an Alternative to MDPSK in the UDLT," September 15, 1982.
9. David Borth, "A Comparative Analysis of Line Codes for Digital Subscriber Line Applications," Technical Report, Project 2692-980-15, April 11, 1983.
10. David Borth and Steve Jasper, "Combined Modulation and Coding Techniques for Land Mobile Radio Applications," March 9, 1984.
11. David Borth, "Signal Processing Estimates for Entertainment Audio processed via DSP methods," July 11, 1984.
12. David Borth and Phillip Rasky, "Signaling Protocol: Type I Hybrid SRT ARQ and Error Control Performance," September 28, 1984.
13. David Borth, "Predicted Error Performance of the Rheingold Signaling System," October 30, 1984.
14. David Borth, "Predicted Error Performance of the Rheingold Signaling System," December 5, 1984.
15. David Borth, "Experimental Evaluation of the Kelah 9.6 kbps Signaling Protocol," January 14, 1985.
16. David Borth, "Advanced Modulation Techniques for Land Mobile Radio Applications," June 20, 1985.

17. David Borth, "Ford Automotive Entertainment System Update," October 24, 1985.
18. David Borth, "Digital Modulation Methods for Cellular Radio," February 14, 1986.
19. David Borth, "Effects of Fixed-Point Arithmetic and Data Quantization on the Performance of Toll and Voiceband Data Echo Cancellers," February 27, 1986.
20. David Borth, "Quantitative Effects of Delayed LMS Update on Buffalo IC," March 24, 1986.
21. David Borth, "CD900 Sensitivity Performance Analysis," March 26, 1986.
22. David Borth, "CD900 DSP Processing Requirements – Preliminary," May 7, 1986.
23. David Borth, "CD900 DSP Processing Requirements – Summary," June 4, 1986.
24. David Borth, "Advantages of Sigma-Delta A/D Converters over other A/D Conversion Technologies," July 11, 1986.
25. Andreas Chrysafis and David Borth, "Digital Sine-Wave Generation on the DSP56000," August 27, 1986.
26. David Borth, "Advanced Digital Modulation Methods for Mobile Radio Communications – A Review," February 10, 1987.
27. David Borth and John Haug, "Digital Filtering with the Motorola DSP56200," March 17, 1987.
28. David Borth and Phillip Rasky, "Advanced Train Control System Reed-Solomon Code Complexity Evaluation," July 24, 1987.
29. David Borth, "Reconstruction of Speech Signals from Fourier Transform Magnitude-Only Information," September 14, 1987.
30. David Borth and George Opas, "Evaluation of the Metricom System," June 30, 1988.
31. David Borth, "Advanced Digital Modulation Methods for Land Mobile Radio Channels – Closing Report, Project 2692-980-24," June 30, 1988.
32. David Borth, "Description of the MLSE Channel Equalizer Employed in the GSM RF Link System," July 12, 1988.
33. David Borth, "Comments on MDI's Reed-Solomon Decoder Implementation," September 8, 1988.
34. David Borth, "Description of the New Soft Decision Algorithm," December 12, 1989.

35. David Borth and Phillip Rasky, "Soft-Decision Information From An MLSE Equalizer via ISI Cancellation," January 2, 1990.
36. David Borth, "Soft-Decision Information From An MLSE Equalizer via ISI Cancellation-Realization of the ISI Cancellation Filter as a Real 9 Tap FIR Filter," February 5, 1990.
37. Phillip Rasky, James Kepler, Nick Tolli, Joseph Nowack, and David Borth, "Qualcomm CDMA Digital Cellular System Performance Analysis," December 31, 1991.
38. David E. Borth, "Mobile Image, Data, and Audio Communication (MIDAC) System Physical Layer Study," January 20, 1992.
39. David Borth (editor), "Communications Research Laboratories Annual Report," 1996-2002 (7 volumes).
40. David Borth (editor), "Wireless Access Research Annual Report," 2003-2004 (2 volumes).
41. David Borth (editor), "Motorola Labs Annual Research Reviews," 2000-2004 (5 volumes).

Exhibit 4

Declaration of Michael L. Katz

**AN ECONOMIC ASSESSMENT OF ARGUMENTS MADE BY
OPPONENTS TO SPECTRUMCO'S AND COX'S PROPOSED
LICENSE ASSIGNMENTS TO VERIZON WIRELESS**

Declaration of Michael L. Katz

March 1, 2012

CONTENTS

I.	INTRODUCTION AND OVERVIEW.....	1
II.	CLAIMS THAT THE LICENSE ASSIGNMENTS WILL CREATE MARKET DOMINANCE ARE UNFOUNDED.....	6
A.	OPPONENTS EXHIBIT A FUNDAMENTAL MISUNDERSTANDING OF THE DRIVERS OF COMPETITION	6
B.	BLOCKING THE PROPOSED TRANSACTIONS WOULD NOT PROMOTE EFFICIENT ENTRY	7
C.	A POLICY OF DISTORTING THE SECONDARY MARKET BY RESERVING SPECTRUM LICENSES FOR SPECIFIC RIVALS WOULD BE UNSOUND AND WOULD HARM CONSUMERS.....	9
III.	CLAIMS THAT VERIZON WIRELESS IS ENGAGED IN ANTICOMPETITIVE SPECTRUM WAREHOUSING ARE INCONSISTENT WITH THE FACTS AND ARE UNFOUNDED	15
A.	CLAIMS THAT VERIZON WIRELESS IS ENGAGED IN ANTICOMPETITIVE SPECTRUM WAREHOUSING ARE INCONSISTENT WITH THE FACTS.....	15
1.	<i>Verizon Wireless has invested billions of dollars per year to increase its capacity and expand output.</i>	<i>15</i>
2.	<i>Verizon Wireless uses its spectrum intensively.</i>	<i>17</i>
B.	NEITHER THE CHEVALIER MODEL NOR OTHER FILINGS ESTABLISH A LOGICAL BASIS FOR CONCLUDING THAT A WAREHOUSING PROBLEM MIGHT EXIST.....	21
1.	<i>Professor Chevalier’s model is internally inconsistent.....</i>	<i>21</i>
2.	<i>Professor Chevalier’s model relies on unrealistic assumptions about wireless technology that generate a misleading result.</i>	<i>23</i>
3.	<i>Professor Chevalier’s model fails to account for product differentiation.</i>	<i>28</i>
4.	<i>Professor Chevalier’s model ignores the benefits of higher quality that consumers would enjoy.</i>	<i>28</i>
5.	<i>Professor Chevalier’s model is not calibrated to the wireless industry.</i>	<i>30</i>
IV.	ATTEMPTS TO GERRYMANDER THE SPECTRUM SCREEN SHOULD BE REJECTED.....	31
A.	THE SPECTRUM-SCREEN TRIGGER SHOULD BE RAISED NOT LOWERED.....	32
B.	SUGGESTIONS FOR A WEIGHTED SCREEN ARE UNSOUND	34

1.	<i>Dollar weighting schemes are severely flawed.</i>	34
2.	<i>Other weighting schemes are also flawed.</i>	38
V.	CONCLUSION	42
VI.	APPENDIX: QUALIFICATIONS	43

I. INTRODUCTION AND OVERVIEW

1. Cellco Partnership d/b/a Verizon Wireless (“Verizon Wireless”) and SpectrumCo, LLC (“SpectrumCo”) have requested the consent of the Federal Communications Commission (“Commission”) to the assignment of 122 Advanced Wireless Services (“AWS-1”) licenses from SpectrumCo to Verizon Wireless.¹ Verizon Wireless and Cox TMI Wireless LLC (“Cox”) have requested the consent of the Commission to the assignment of 30 AWS-1 licenses from Cox to Verizon Wireless.
2. At the request of counsel for Verizon Wireless, I have conducted an analysis of the central economic arguments made in filings submitted in this proceeding in opposition to the proposed license assignments.² This analysis reveals that the central economic claims made in opposition to the proposed license assignments are fundamentally unsound and are without logical or factual foundation.

¹ AWS-1 refers to wireless spectrum in the 1710-1755 and 2110-2155 MHz bands.

² I have not attempted to identify and analyze every argument made in opposition. Rather I have focused on what appear to be the most significant arguments. The fact that an argument may have been raised without my discussing it below does not indicate that I support that argument or believe that its conclusions are correct.

My analysis also does not consider arguments based on claims regarding other commercial agreements between Verizon Wireless, Cox, and SpectrumCo. My understanding is that the proposed license assignments are separate from and independent of any other commercial agreements between the parties. (*See, e.g.,* Letter from Bryan N. Tramont to Marlene H. Dortch, WT Docket No. 12-4, at 2 (Feb. 9, 2012)) and, whether or not the other commercial agreements remain in effect, neither SpectrumCo nor Cox is—or is planning to become—a facilities-based wireless telecommunications service provider at this time. (*See* Declaration of Robert Pick, Chief Executive Officer, Exhibit 4 to SpectrumCo. LLC, *Application of Cellco Partnership d/b/a Verizon Wireless and SpectrumCo LLC For Consent To Assign Licenses*, WT Docket No. 12-04, December 16, 2011 (hereinafter, *Pick Declaration*), and Declaration of Suzanne Fenwick, Executive Director for Corporate Development, Cox Communications, Exhibit 4 to *Application of Cellco Partnership d/b/a Verizon Wireless and Cox TMI Wireless, LLC For Consent To Assign Licenses*, WT Docket No. 12-04, December 20, 2011 (hereinafter, *Fenwick Declaration*).)

3. The principal objection made by opponents of the license assignments is the assertion that the assignments would result in Verizon Wireless's having access to "too much" spectrum. There are two forms in which this argument has been made, each of which is contradictory to economic logic and factual evidence.

4. One form of the argument is the assertion that the Commission should second-guess the secondary market and restrict the ability of license holders to sell their spectrum rights to Verizon Wireless because such second-guessing allegedly would steer the spectrum rights to higher-value uses.³ As I demonstrate below, distorting or limiting secondary market sales to favor certain potential buyers could be expected to harm consumers through several mechanisms. First, it would undermine the ability of the secondary market to assign spectrum to its highest-value uses. Second, a policy that favors certain potential buyers in the secondary market for spectrum rights would distort competition in markets for wireless telecommunications services provided to end users. Third, such a policy would be unlikely to promote new entry and, indeed, could make entry riskier and less attractive.

³ See, e.g., Petition to Deny of Free Press, *Application of Cellco Partnership d/b/a Verizon Wireless and SpectrumCo LLC For Consent To Assign Licenses and Application of Cellco Partnership d/b/a Verizon Wireless and Cox TMI Wireless, LLC, For Consent To Assign License*, WT Docket 12-4, February 21, 2012 (hereinafter *Free Press Petition*), § III.C; RCA – The Competitive Carriers Association, Petition to Condition or Otherwise Deny Transactions, *Application of Cellco Partnership d/b/a Verizon Wireless and SpectrumCo LLC For Consent To Assign Licenses and Application of Cellco Partnership d/b/a Verizon Wireless and Cox TMI Wireless, LLC, For Consent To Assign Licenses*, WT Docket 12-4, February 21, 2012 (hereinafter *RCA Petition*), § III.C; Petition to Deny of T-Mobile, USA, Inc., *Application of Cellco Partnership d/b/a Verizon Wireless and SpectrumCo LLC For Consent To Assign Licenses and Application of Cellco Partnership d/b/a Verizon Wireless and Cox TMI Wireless, LLC, For Consent To Assign License*, WT Docket 12-4, February 21, 2012 (hereinafter *T-Mobile Petition*), at 4-5.

5. The other form of the argument is the claim that Verizon Wireless would warehouse the assigned spectrum to deny rival wireless service providers access to it.⁴ Although most parties making this claim offer little more than pure assertion, Professor Chevalier presents a formal model that she interprets as saying that Verizon Wireless *could* have incentives to engage in such behavior *if* the right conditions were present.⁵ However, her model makes inapposite assumptions that render it useless for the task of assessing the competitive effects of the proposed transactions. Moreover, Professor Chevalier makes no attempt to examine actual market conditions to determine if her model would predict that Verizon Wireless would engage in anticompetitive spectrum warehousing.

6. As demonstrated below, the various claims that Verizon Wireless is engaging in anticompetitive warehousing are inconsistent with the facts. Proponents of this theory cannot explain why Verizon Wireless has invested billions of dollars annually to expand its capacity and why it uses its existing spectrum rights more intensively than many of its rivals use theirs.

7. Having failed to present a convincing case that the license assignments would likely result in harm to competition, several commenters argue that: (a) the Commission should make significant *ad hoc* alterations to its spectrum aggregation screen, and (b) the altered screen indicates the existence of competitive concerns.⁶

⁴ See, e.g., *T-Mobile Petition* at 4-5 and 13-15; *RCA Petition*, §II.A.

⁵ Declaration of Professor Judith Chevalier, Exhibit A to *T-Mobile Petition*, February 21, 2012 (hereinafter *Chevalier Declaration*), ¶¶ 20 and 39, and Appendix B.

⁶ *T-Mobile Petition*, §IV.B; Declaration of Peter Cramton, Exhibit C to *T-Mobile Petition*, February 20, 2012 (hereinafter *Cramton Declaration*), ¶¶ 15-37; *RCA Petition*, §VII.C; *Free Press Petition*, § III.A.

8. Each of the specific proposals for changing the spectrum screen is fatally flawed and, thus, cannot serve as a useful tool for a case-by-case analysis. For example, RCA — The Competitive Carriers Association (“RCA”) seeks to alter the screen by modifying the amount of spectrum included in the screen or by reducing the amount of spectrum necessary to trigger further review.⁷ These suggestions fail to take an appropriately forward-looking view of the industry and are based on incorrect assumptions about the functioning of wireless markets.

9. Several commenters make suggestions for giving some spectrum bands greater weight per megahertz than others in the spectrum aggregation screen. These suggestions fall into two broad categories:

- Some commenters propose to apply what they claim are propagation-based weights. That is, these commenters assert that certain blocks of spectrum are better suited for mobile telecommunications services, particularly LTE, than are others, and that the better-suited bands should be given more weight per megahertz than the less-well-suited bands. These commenters overstate the disadvantages of higher frequencies while ignoring their advantages.⁸ They also make incorrect statements about which bands are suitable for LTE and ignore the existence of global business ecosystems supporting the development of LTE in a variety of spectrum bands. These proposed changes to the spectrum aggregation screen

⁷ *RCA Petition*, §VII.C.

⁸ These commenters also ignore the fact that the spectrum involved in the proposed license assignments is not in any of the bands that these commenters identify as being especially valuable, and, thus, under their view of the world should be of relatively little consequence for competition.

should be rejected because they will not improve the Commission's review of license assignments.

- Several commenters advocate the use of dollar-value weights (*i.e.*, spectrum that sells at a higher price per megahertz or has a greater book value would be given greater weight). Although it might have a superficial appearance of being “market-driven,” this proposal is based on a fundamental misunderstanding of how markets operate. The per-MHz, per-POP dollar value of a spectrum license reflects many different factors, including the geographic scope of the license, the presence of incumbent users, projections of wireless demand, the possibility of future license primary auctions at the time of sale, and spectrum propagation characteristics.

In order for there to be any logic underlying the use of a dollar-weighted scheme, one must establish that the wide range of factors that drive license prices or book values all somehow reflect the resulting competitive conditions. Not only have proponents of a dollar-weighted screen failed to establish that any such relationships exist, proper economic analysis clearly indicates that prices or book values are extremely poor indexes of competitive implications. The central flaw inherent in dollar weighting is the failure to recognize that the production of wireless services requires a mix of inputs. For example, a service provider with “cheap” spectrum and expensive network infrastructure may be a stronger competitor than a provider with an equal number of megahertz of “expensive”

spectrum and a cheap network infrastructure. Yet a dollar-weighted screen would indicate the opposite.

10. The remainder of this declaration explains these findings in greater depth and provides details of the facts and analysis that led me to reach them.

II. CLAIMS THAT THE LICENSE ASSIGNMENTS WILL CREATE MARKET DOMINANCE ARE UNFOUNDED

11. Some opponents argue that the spectrum licenses at issue should be reserved for new service providers or for particular incumbent service providers other than Verizon Wireless in order to promote competition.⁹ In this section, I examine this argument and show that it is unsound.

A. OPPONENTS EXHIBIT A FUNDAMENTAL MISUNDERSTANDING OF THE DRIVERS OF COMPETITION

12. Opponents of the license assignments appear to believe that having additional spectrum automatically creates dominance. It is clear that spectrum access is an important input. But it is equally clear that there are many other elements that are important for commercial success, including investments in network infrastructure, customer service, and marketing. Some service providers are more successful than others at providing products, customer service, marketing, and other activities that consumers find attractive. Those service providers that are most successful in offering services and products that consumers desire are the providers that have greatest demands for spectrum licenses. Hence, the claim that large spectrum license holdings trigger competitive success is exactly backward; in fact, competitive success triggers a service provider's demand for additional spectrum rights.

⁹ *RCA Petition at 7; T-Mobile Petition at 15. See also Free Press Petition at 27.*

13. The fact that competitive success triggers a service provider's demand for additional spectrum rights has important implications for understanding the consumer-welfare effects of the proposed license assignments. Although it may be true that the proposed assignments would lead in the short term to an increase in the concentration of spectrum holdings, it is critical to recognize that this increase would be the result of Verizon Wireless's success in using its existing spectrum rights to offer services that consumers find attractive relative to those of rival wireless service providers.¹⁰ An increase in concentration that is triggered by strong competition by a leading competitor is a sign that consumers are *benefiting* from improved service offerings.

B. BLOCKING THE PROPOSED TRANSACTIONS WOULD NOT PROMOTE
EFFICIENT ENTRY

14. A claim that reserving spectrum rights for entrants will benefit consumers is based on the implicit assumptions that: (a) a lack of spectrum access has inefficiently suppressed entry, and (b) granting entrants favored status in secondary markets for spectrum access would lead to the entry of viable competitors that will have significant beneficial impacts on consumer welfare. There is little or no evidence to support either assumption. In fact, blocking the proposed transactions would not promote efficient entry and, for reasons described below, could reduce future entry.¹¹

¹⁰ This is one regard in which the proposed transactions are very different than a typical merger. In the case of a merger, an increase in concentration is driven by the elimination of a competitor (the effects of which are weighed by antitrust enforcers against possible efficiency benefits). In contrast, the proposed license assignment does not reduce the wireless telecommunications options available to consumers in any part of the United States.

¹¹ The adjective "efficient" is necessary because blocking expansion by successful incumbents could, in theory, promote inefficient entry through the following mechanism: denied the ability to obtain license to additional spectrum, incumbents would become capacity

15. There is no evidence that the number of wireless telecommunications service providers has been driven by an inability of entrants to obtain access to spectrum licenses. There are entities holding spectrum licenses that they are not currently utilizing. SpectrumCo is one such entity. Although SpectrumCo has access to spectrum allocated to the provision of mobile telecommunications services, SpectrumCo¹²

evaluated the investment necessary to deploy and operate a wireless network using this spectrum and, based on a variety of marketplace factors, ultimately concluded as a business matter that entering the wireless marketplace as a standalone facilities-based provider would not provide a return on that investment that would warrant incurring the significant costs and risks involved.

Similarly, after entering the wireless telecommunications industry, Cox “concluded that it was uneconomic to provide 3G wireless services utilizing its own network infrastructure.”¹³

16. The notion that spectrum licenses are somehow simply too expensive for a new entrant to purchase is belied by the fact that several companies (*e.g.*, Apple, Google, and Microsoft) already play important roles in the wireless ecosystem and have billions of dollars in cash available to purchase licenses if they wished to do so.

17. Rather than being a function of an alleged inability of potential entrants to obtain spectrum licenses, the industry’s evolution provides evidence that the number of providers is

constrained and face increasingly high marginal costs of providing service, resulting in higher prices, lower service quality or both. The policy-induced limit on output would drive up prices, harming consumers and potentially attracting entrants that would have not been profitable at the competitive price that would have prevailed absent the restrictive spectrum policy.

¹² *Pick Declaration*, ¶ 10.

¹³ *Fenwick Declaration*, ¶ 5. Cox Wireless acted as an MVNO using Sprint Nextel’s network but never offered services over its own facilities. Cox currently is exiting the MVNO business and transitioning its customers. (*Id.*, ¶¶ 4-6.)

being driven by the overall economics of providing mobile telecommunications services. A wide range of firms have entered the industry, consolidation has taken place, and antitrust authorities have approved the underlying transactions after having concluded that they promoted competition and consumer welfare. Concentration has been driven by greater efficiency of large firms rather than the inability of small firms to obtain spectrum.

18. Moreover, even if there were too few service providers and regulators somehow knew the “right” number of competitors, attempting to steer the licenses at issue in this matter to potential entrants would be a poor means of strengthening competition. Spectrum alone will not automatically lead to successful entry and increased competition. In fact, there is reason to be concerned that service providers who were able to enter the market solely because they were given favored regulatory treatment would be particularly likely to lack the other skills and assets needed for success. For example, such a public policy might promote entry by less well-capitalized entities with less money to invest in network build-out. The principal effect of assigning licenses to such firms may be to put spectrum in the hands of firms that are incapable of bringing to market services that consumers find attractive relative to existing alternatives.

C. A POLICY OF DISTORTING THE SECONDARY MARKET BY RESERVING SPECTRUM LICENSES FOR SPECIFIC RIVALS WOULD BE UNSOUND AND WOULD HARM CONSUMERS

19. Several opponents of the proposed transactions have made alternative suggestions regarding who should be eligible to acquire the spectrum, often basing these proposals on the notion that some market participants will use the spectrum more efficiently and better serve customer needs. For example, in her declaration on behalf of T-Mobile USA (“T-Mobile”), Professor Chevalier suggests that the spectrum rights that Verizon Wireless proposes to

acquire would be better utilized by a smaller market participant, such as T-Mobile.¹⁴ Free Press and RCA argue that Verizon Wireless should be denied access to additional spectrum because other network operators would allegedly utilize the spectrum sooner than would Verizon Wireless.¹⁵

20. Two broad points are worth noting at the outset. First, the Commission’s objective in evaluating the proposed license assignments should not be to promote the interests of specific wireless service providers. The Commission’s fundamental approach to promoting the public interest in the wireless marketplace has been to promote and protect undistorted competition. Doing so best serves consumer interests because it allows those interests (as expressed through market forces) to drive the services and applications that are commercially successful and, thus, are offered to consumers. As the Commission has long recognized, there is a fundamental distinction between protecting competition and protecting competitors. Unfortunately, several opponents to the proposed license assignments are attempting to conflate the two. A policy of distorting the secondary market by reserving spectrum for specific rivals would benefit those rivals, but harm consumers.

21. Second, this proposed rationale for rejecting the license assignments runs directly counter to the Commission’s conclusion that “Section 310(d) of the Act limits our consideration to the buyer proposed in an assignment application, and we cannot consider

¹⁴ *Chevalier Declaration*, ¶ 36.

¹⁵ *Free Press Petition*, §III.C; *RCA Petition*, §III.C.

whether some other proposal might comparatively better serve the public interest.”¹⁶ This statement accords with the general approach to the economic review of mergers and other asset exchanges. That approach examines whether the proposed transaction would benefit or harm consumers in comparison with the status quo, rather than in comparison with a hypothetical transaction involving other parties that competition authorities might be able to imagine.

22. Even if one ignored the Commission’s earlier conclusion, economic analysis strongly indicates that a policy of reserving secondary-market purchases for certain providers or classes of providers would be misguided and harmful to consumers. Specifically, distorting or limiting secondary market sales to favor certain potential buyers would lead to inefficient spectrum assignment and could make entry riskier.

23. Blocking the license assignments in order to deny Verizon Wireless access to additional spectrum would distort competition by skewing market outcomes in favor of certain service providers. There is widespread recognition that the United States faces a critical shortage of spectrum to support the explosive growth in demand for mobile telecommunications services.¹⁷ A policy of limiting Verizon Wireless’s access to additional spectrum licenses in the secondary market would make the effects of this shortage worse.

¹⁶ See *In re Application of Citadel Commc’ns Co., Ltd. (Assignor) & Act III Broad. of Buffalo, Inc. (Assignee) for Assignment of License of Television Station WUTV(TV), Buffalo, New York*, Memorandum Opinion and Order, 5 FCC Rcd. 3842, 3844, (1990), ¶ 16.

¹⁷ For example, Cisco projects that North American mobile data traffic will have a compound annual growth rate of 75 percent between 2011 and 2016. (“Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2011–2016,” February 14, 2012, Table 5), available at http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-520862.pdf, site visited February 20, 2012.

Specifically, a policy of blocking commercially successful firms from acquiring additional spectrum licenses would undermine the ability of the secondary market to assign spectrum to its highest-value uses, especially when those uses would otherwise involve innovative and expanded service offerings by successful firms.¹⁸ Those providers whose services are most attractive to consumers would be limited in their ability to obtain an essential input.

24. As just noted, in considering an assignment application, the Commission has determined that it cannot consider whether some other transaction might better serve the public interest. Nevertheless, some opponents of the proposed assignment argue that Verizon Wireless should not be allowed to obtain these spectrum rights because they claim Verizon Wireless would not put the spectrum to its highest-value use. In addition to attempting to apply an inappropriate standard, these opponents fail to demonstrate that Verizon Wireless would not put the spectrum licenses at issue to their highest-value use.

25. Some opponents of the proposed license assignments attempt to justify their conclusion by observing that Verizon Wireless has not immediately built out network infrastructure for some of its assigned blocks of spectrum.¹⁹ As discussed in Section III.A.2

¹⁸ The Commission's National Broadband Plan discusses the importance of allowing spectrum to flow to its best uses in secondary markets:

Flexibility of use enables markets in spectrum, allowing innovation and capital formation to occur with greater efficiency. More flexible spectrum rights will help ensure that spectrum moves to more productive uses, including mobile broadband, through voluntary market mechanisms.

Spectrum flexibility, both for service rules and license transfers, has created enormous value.

(Federal Communications Commission (2010), "Connecting America: The National Broadband Plan," at 79.)

¹⁹ See *T-Mobile Petition* at 3-4 and 35; *RCA Petition* at 20-21; Petition to Deny of the Rural Telecommunications Group, Inc., *Application of Cellco Partnership d/b/a Verizon Wireless*

below, such claims are based on a misunderstanding of the economics and engineering of large-scale, cellular networks and the operation of spectrum license markets. There is nothing inefficient about having forward-looking strategies for spectrum acquisition and network construction.

26. Similarly, there is no sound basis for claims made by the assignments' opponents that Verizon Wireless would not put the transferred spectrum licenses to their highest-value use because Verizon Wireless allegedly does not use spectrum intensively enough.²⁰ Indeed, as discussed in Section III.A.2 below, by the measure used by Verizon Wireless in its ordinary course of business, and in an independent analysis, Verizon Wireless was found to use spectrum more intensively than T-Mobile, notwithstanding T-Mobile's assertion that it would put the spectrum involved in the proposed transfer to greater use.

27. In addition to harming competition by skewing market outcomes in favor of certain service providers, distorting secondary markets has subtle adverse effects that arise from the linkage between primary and secondary markets. For reasons that I will now discuss, constraining secondary-market transactions by blocking a successful incumbent service provider, such as Verizon Wireless, from acquiring licenses in the secondary market could discourage bidding by potential entrants in initial spectrum auctions conducted by the Commission.

and SpectrumCo LLC For Consent To Assign Licenses and Application of Cellco Partnership d/b/a Verizon Wireless and Cox TMI Wireless, LLC, For Consent To Assign License, WT Docket 12-4, February 21, 2012 (hereinafter RTG Petition) at 11.

²⁰ See *T-Mobile Petition*, at 35; *RCA Petition*, at 20-21; *Free Press Petition* at 27-28.

28. Limiting the ability of highly successful incumbent service to purchase spectrum licenses in secondary markets can be expected to reduce secondary-market revenues. This is so because these excluded bidders—by virtue of their demonstrated success in selling services highly demanded by consumers—are the very firms likely to value the licenses most highly and, thus, to be willing to pay the most in secondary markets to obtain licenses. Hence, a policy that precludes highly successful incumbent service providers from participating in the secondary market as buyers could dramatically reduce expected resale revenues. This fact will have consequences for bidding by potential entrants in the initial auctions of spectrum licenses.

29. Entry is an uncertain proposition. Through experience, entrants frequently learn that they do not have attractive business models and seek to exit the market. The most attractive exit option may be to sell spectrum licenses (and possibly other assets) to Verizon Wireless. From a social point of view, selling licenses from a failed or failing business to an incumbent through a secondary-market transaction would redirect spectrum to a higher-value use and, thus, generate social benefits. Moreover, by reducing entrants' exit options, a ban on resale transactions to Verizon Wireless could discourage initial entry attempts: a new firm could be discouraged from attempting to enter the market when facing the knowledge that it would not have the option of selling its assets to an incumbent service provider if the entrant's business plans did not pan out. Hence, far from promoting entry, a policy approach that blocked the present transactions could discourage future entry.

III. CLAIMS THAT VERIZON WIRELESS IS ENGAGED IN ANTICOMPETITIVE SPECTRUM WAREHOUSING ARE INCONSISTENT WITH THE FACTS AND ARE UNFOUNDED

30. Some commenters raise the concern that Verizon Wireless might not intend to put the spectrum at issue to use but, rather, intends to warehouse or hoard the spectrum in order to deny access to Verizon's rivals.²¹ An examination of the facts and economic logic demonstrate that such concerns are misplaced.

A. CLAIMS THAT VERIZON WIRELESS IS ENGAGED IN ANTICOMPETITIVE SPECTRUM WAREHOUSING ARE INCONSISTENT WITH THE FACTS

31. The core of the spectrum warehousing claims made by opponents to the proposed license assignments is that Verizon Wireless is potentially engaged in a strategy of purchasing spectrum in order to prevent it from being put to productive use. That is, under opponents' warehousing theory, Verizon Wireless is spending billions of dollars in order to prevent output expansion. But in stark contrast to a firm trying to suppress output, Verizon Wireless has continuously expanded its capacity and output levels, and it has done so by making intensive use of its spectrum licenses.

1. *Verizon Wireless has invested billions of dollars per year to increase its capacity and expand output.*

32. Verizon Wireless has invested billions of dollars in its network, both to expand capacity on its 3G network and to implement and expand its LTE network. Up to a point, a wireless service provider can increase the spectral efficiency of its network by various means, including splitting conventional macro cells, using various forms of micro cells, and implementing new radio network technologies. Verizon Wireless has used—and continues to

²¹ See, e.g., *RCA Petition*, §II.A; *T-Mobile Petition* at 4-5 and 13-15; and *Chevalier Declaration*, ¶ 39.

use—these means to address its capacity needs.²² For example, Verizon Wireless continues to split cells to increase 3G capacity.²³ Verizon Wireless has also made extensive, ongoing investments in LTE, a radio network technology that is more efficient than 3G. Verizon Wireless’s LTE network thus is able to handle more traffic than a 3G network holding other factors, such as the amount of spectrum utilized, equal. Verizon Wireless’s capital expenditures on its network have been increasing: in 2009 Verizon Wireless spent \$6.3 billion; in 2010 the company spent \$7.7 billion; and in 2011 it spent \$8.3 billion.²⁴

33. Verizon Wireless’s output has grown rapidly in recent years. According to Verizon Wireless’s Executive Director of Network Strategy, William Stone, from fourth quarter 2006 to fourth quarter 2011 Verizon Wireless “experienced a compounded annual data traffic growth rate of approximately 94% year over year, meaning that data usage has nearly doubled each consecutive year for the past five years.”²⁵ This increasing demand on Verizon Wireless’s network can be explained both by the growth in the number of devices on its network and a shift in the mix of devices toward broadband-intensive devices. At the end of

²² Supplemental Declaration of William H. Stone, Exhibit 2 to Joint Opposition of Verizon Wireless, SpectrumCo LLC, and Cox TMI Wireless, LLC, *Application of Cellco Partnership d/b/a Verizon Wireless and SpectrumCo LLC For Consent To Assign Licenses and Application of Cellco Partnership d/b/a Verizon Wireless and Cox TMI Wireless, LLC, For Consent To Assign License*, WT Docket 12-4, March 2, 2012 (hereinafter *Joint Opposition*), March 2, 2012 (hereinafter *Stone Supplemental Declaration*), ¶¶ 41-48.

²³ *Stone Supplemental Declaration*, ¶ 43.

²⁴ *Stone Supplemental Declaration*, ¶ 5.

²⁵ Declaration of William H. Stone, Executive Director of Network Strategy for Verizon, Exhibit 3 to *Application of Cellco Partnership d/b/a Verizon Wireless and SpectrumCo LLC For Consent To Assign Licenses*, WT Docket No. 12-04, December 16, 2011, ¶ 6.

2011, Verizon Wireless had 108.7 million connections, representing an increase of 6.5 percent over the previous year.²⁶

2. *Verizon Wireless uses its spectrum intensively.*

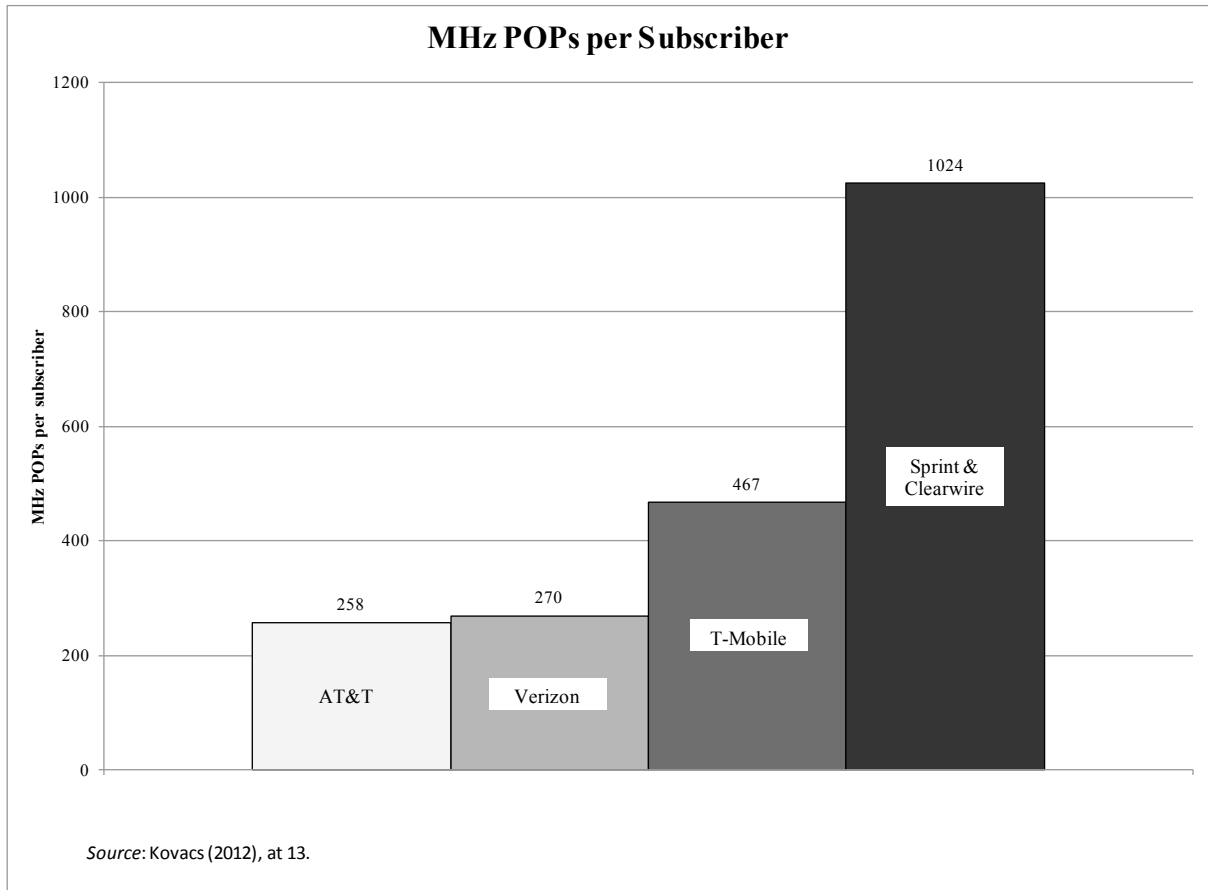
34. Given Verizon Wireless's capital investments and output growth, it is not surprising that, far from sitting on warehoused spectrum, Verizon Wireless makes efficient use of its spectrum licenses. An analysis by Anna-Maria Kovacs finds that Verizon Wireless has access to considerably less spectrum relative to the demand for its services than do either T-Mobile or Sprint/Clearwire.^{27, 28} Figure 1 below shows that Verizon Wireless has 270 MHz POPs per subscriber, which is about equal to AT&T's holdings per subscriber. T-Mobile's holdings per subscriber are 73 percent larger than Verizon Wireless's, and Sprint/Clearwire's holdings per subscriber are 279 percent larger than Verizon Wireless's.

²⁶ *Stone Supplemental Declaration*, ¶ 11.

²⁷ Either Sprint and Clearwire should be considered together in assessing Sprint's access to spectrum, or the Commission should conclude that Sprint chose to stop having access to Clearwire's spectrum, which suggests Sprint does not face a current spectrum shortage.

²⁸ Anna-Maria Kovacs (2012), "Neutral Spectrum Auctions: Maximizing Proceeds and Consumer Benefit," Economic Policy Vignette 2012-2-13, Georgetown University, *available at* http://www.gcbpp.org/files/EPV/EPV_Kovacs_SpectrumAuctions_21312.pdf, *site visited* March 1, 2012 (hereinafter *Kovacs (2012)*).

Figure 1: A Comparison of the Intensity of Spectrum Use



35. It is my understanding that Verizon Wireless uses a measure of spectral efficiency in its ordinary course of business that yields comparable results. By that measure, Verizon Wireless is the most spectrally efficient of the four largest wireless service providers in the United States.²⁹ Specifically, Verizon Wireless calculates that it currently serves over 1.2 million connections per MHz. Verizon Wireless calculates that, after the pending AT&T license assignments to T-Mobile are complete, AT&T will have slightly fewer than 1.2 million customer connections per MHz, while T-Mobile will have only 0.6 million customer

²⁹ The statements in this paragraph are all based on facts reported in *Joint Opposition*, § I.D.

connections per MHz. Excluding Clearwire spectrum from the calculation, Sprint has fewer than one million customer connections per MHz, and, if one includes Clearwire spectrum, Sprint has fewer than .6 million customer connections per MHz. Verizon Wireless also calculates that it uses spectrum more intensively than do US Cellular, C Spire, Metro PCS, and Leap (Cricket).

36. Far from warehousing spectrum obtained in recent transactions that involved the acquisition of existing customers as well as spectrum, Verizon Wireless has improved the network and enhanced service for the customers it acquired. In 2008, Verizon Wireless acquired ALLTEL and Rural Cellular Corporation (“RCC”). Verizon Wireless has performed a comprehensive upgrade of ALLTEL’s and RCC’s networks to the 3G technology, EvDO Rev. A.³⁰ Moreover, Verizon Wireless plans to extend its 4G LTE network coverage to be similar to its 3G coverage by mid-2013.³¹

37. Various critics of the proposed license assignments point to Verizon Wireless’s strategy toward utilizing its AWS F block licenses as evidence that the Commission should be concerned that Verizon Wireless is engaged in anticompetitive warehousing.³² In contrast to critics’ claims, Verizon Wireless has plans to use this spectrum to increase capacity and

³⁰ Comments of Verizon Wireless, *In the Matter of Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Mobile Wireless, including Commercial Mobile Services*, WT Docket 11-186, December 5, 2011, at 144-45.

³¹ Thomson Reuters Streetevents, Edited Transcript, VZ – Q4 2011 Verizon Earnings Conference Call, at 3 (Jan. 24, 2012), *available at* http://www22.verizon.com/idc/groups/public/documents/adacct/4q11_vz_transcript.pdf, site visited March 1, 2012.

³² *RCA Petition* at 20-21; *RTG Petition* at 20; *T-Mobile Petition* at 3-4, 35-36; *Chevalier Declaration*, ¶¶ 35-37 and 39.

output.³³ Moreover, assertions that Verizon Wireless should have been forced to use the spectrum immediately belie an ignorance of the economics and engineering of large-scale, cellular networks and the operation of spectrum license markets. Four factors, in particular, appear to have been ignored. First, it can take several years from the time spectrum is acquired to the time that a network can be brought up and running using that spectrum. Second, network infrastructure is expensive and long lived. Third, it is costly to migrate consumers quickly from one network technology to another. Fourth, large spectrum licenses become available infrequently and with great uncertainty. It is thus commercially prudent and economically efficient to plan ahead. Moreover, claims that all spectrum should have network infrastructure constructed to utilize it immediately after acquisition—in addition to not being required by Commission policy—make no economic sense.³⁴ It could well be a recipe for constructing networks that were unneeded when constructed, and technologically out-of-date when later needed.

³³ *Stone Supplemental Declaration*, ¶¶ 27-29.

³⁴ For this reason, Public Knowledge *et al.*'s recommendation to impose "a tight schedule for deployment" on the proposed license assignments would be unsound. (Petition To Deny Of Public Knowledge, Media Access Project, New America Foundation Open Technology Initiative, Benton Foundation, Access Humboldt, Center For Rural Strategies, Future Of Music Coalition, National Consumer Law Center, On Behalf Of Its Low-Income Clients, and Writers Guild Of America, West, *Application of Cellco Partnership d/b/a Verizon Wireless and SpectrumCo LLC For Consent To Assign Licenses and Application of Cellco Partnership d/b/a Verizon Wireless and Cox TMI Wireless, LLC, For Consent To Assign License*, WT Docket 12-4, February 21, 2012 (hereinafter *Public Knowledge Petition*), at 49.)

B. NEITHER THE CHEVALIER MODEL NOR OTHER FILINGS ESTABLISH A LOGICAL BASIS FOR CONCLUDING THAT A WAREHOUSING PROBLEM MIGHT EXIST

38. Although multiple commenters raise the possibility of spectrum warehousing, with one exception, they simply make assertions that warehousing will or might occur. The one exception is Professor Chevalier, who presents a theoretical model identifying certain conditions under which warehousing could be a rational strategy.³⁵ Notably, Professor Chevalier is careful not to state that her model establishes the existence of a problem with respect to the proposed license assignments.³⁶ This care is warranted, because her model relies on several unrealistic assumptions that make it inapplicable to the wireless industry.

1. *Professor Chevalier's model is internally inconsistent.*

39. Interpretation of Professor Chevalier's model is made difficult by the fact that it appears to be internally inconsistent. Professor Chevalier posits a model that assumes that the four suppliers each produce a homogeneous product.³⁷ She then characterizes equilibrium under the assumption that firms engage in what is known as undifferentiated Bertrand pricing.³⁸ Under this assumption, all suppliers' services are perfect substitutes for one another and each firm believes that its rivals will hold their prices constant even as it varies its own price. Consequently, as long as a service provider's individual output is less than the total

³⁵ *Chevalier Declaration*, Appendix B.

³⁶ *See, e.g., Chevalier Declaration*, ¶20, which discusses the theoretical possibility of warehousing but makes no claim that the possibility actually arises with the proposed transactions.

³⁷ *Chevalier Declaration*, Appendix B, at 1.

³⁸ *Chevalier Declaration*, Appendix B, at 2 ("If the firms Bertrand compete on price and produce full capacity, the equilibrium price in this market will be $P^*=c3$.").

market demand at its current price, the firm perceives itself as facing a perfectly horizontal firm-specific demand curve, which thus coincides with its marginal revenue curve.³⁹

40. This assumed pricing behavior is inconsistent with another assumption of the model; namely, that a firm recognizes that its rivals face capacity constraints and, thus, its choice of output can affect the market price.⁴⁰ In other words, a service provider recognizes that it faces a downward-sloping firm-specific demand curve when its rivals are capacity constrained. The assumption that a firm faces a flat firm-specific demand curve is inconsistent with the assumption that the firm faces a downward-sloping firm-specific demand curve.

41. Another way to see this apparent inconsistency is to observe that Firm C in the model is behaving irrationally under the outcome that Professor Chevalier identifies as the equilibrium in her Figure 1. Specifically, Firm C could increase its profits by producing one unit of output rather than two.⁴¹

42. In the discussion that follows, I will consider a firm that faces a standard downward-sloping firm-specific demand curve. Such a demand curve will give rise to a downward-sloping marginal revenue curve, which plays a central role in a provider's output choice.

³⁹ The assumption that wireless service providers offer perfectly undifferentiated products is manifestly a poor fit to the wireless marketplace. This fact has implications for provider pricing behavior and the demand for spectrum. I will return to these issues below.

⁴⁰ This assumption is central to the derivation of the inequalities on page 3 of the *Chevalier Declaration's* appendix presenting the model.

⁴¹ In terms of Professor Chevalier's notation, Firm C's profits would rise from $(C3 - C2)$ to $(C4 - C2)$.

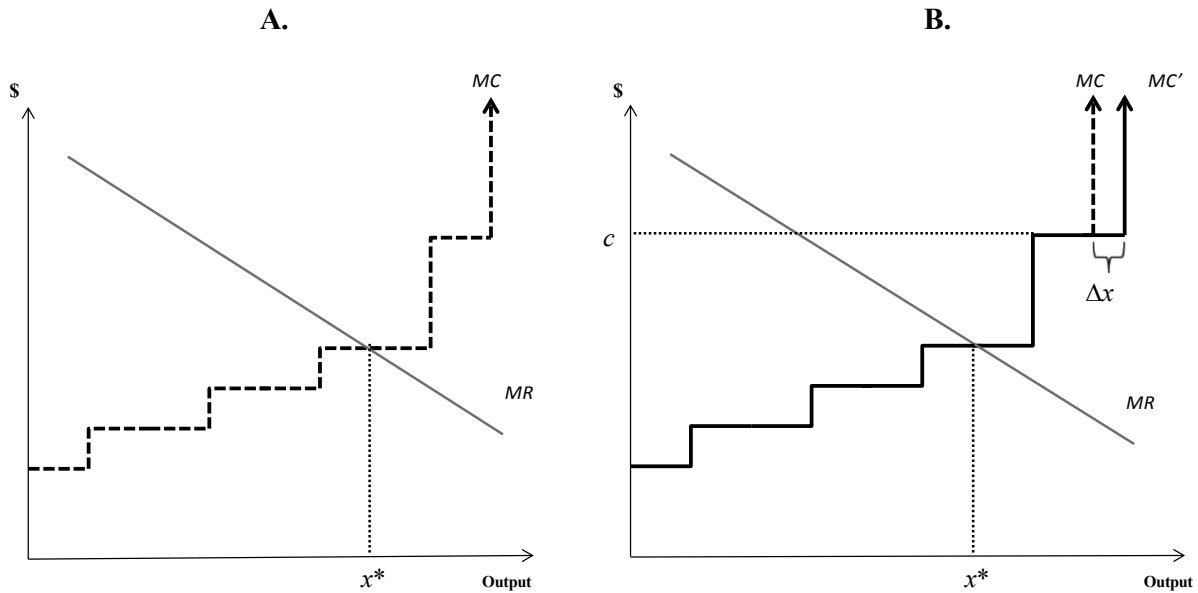
Specifically, an economically rational firm will choose to produce output at the point where its marginal revenue is equal to marginal cost.⁴²

2. *Professor Chevalier's model relies on unrealistic assumptions about wireless technology that generate a misleading result.*

43. The most fundamental problem with Professor Chevalier's model for the task at hand is that the model is based on an extremely unrealistic assumption regarding the relationship between a service provider's spectrum license holdings and its marginal costs. In particular, the model assumes that a unit of spectrum generates a unit of output when combined with a discrete lump of capital. The implication of this assumption for a service provider's marginal cost curve is illustrated in Figure 2. The dashed "stair steps" in Panel A of the figure show the service provider's marginal cost of output given its baseline spectrum licenses. Under Professor Chevalier's model, the cost curve increases as the firm has to utilize increasingly expensive units of capacity to serve its customers.

⁴² Michael Katz and Harvey Rosen (1998), *Microeconomics*, 3rd Edition, Irwin McGraw-Hill, at 212.

Figure 2: Impact of Additional Spectrum in Professor Chevalier's Model



44. Professor Chevalier's model assumes that an additional unit of spectrum allows the firm to produce one additional unit of output. That is, the model assumes that additional spectrum has no effect on the firm's cost of providing any unit of service except for a discrete, final increment of capacity.⁴³ The solid stair steps in Panel B of the figure illustrate the provider's marginal cost curve when it has an additional unit of spectrum. Under the assumption of Professor Chevalier's model, the new marginal cost curve coincides with the original one up until the last unit of capacity. As shown the figure, a provider with access to an additional unit of spectrum access has the capacity to produce Δx units of output can do so at cost c .

⁴³ Professor Chevalier also proffers an example in which the additional unit of capacity is used to reduce the cost of producing what is known as an inframarginal unit of output. (*Chevalier Declaration*, Appendix B, at 4.) However, she never considers an example in which the capacity lowers costs on units that are relevant to the supplier's marginal decision calculus with respect to output. As I describe below, this unrealistic assumption drives her central finding.

45. Figure 2 has been drawn to illustrate Professor Chevalier's warehousing case. A firm with the marginal revenue and marginal cost curves shown in the figure would produce x^* units of output with or without the additional spectrum. As I will now discuss, this finding is the consequence of the unrealistic assumption about the nature of the shift in the marginal cost curve as the firm acquires additional spectrum rights.

46. The actual nature of cost shifts is much different than that portrayed in Professor Chevalier's model. A service provider with access to a given amount of spectrum faces a set of increasingly costly options as it expands its output. Consider a service provider that has access to a fixed amount of spectrum, is seeking to hold its service quality constant, and faces increasing demand for its services. As demand increases, because either the number of users is rising or the amount of service demanded by each consumer is rising, or both, it becomes necessary to utilize additional network equipment in order to serve consumers. A mobile service provider has several options for expanding service on a fixed amount of spectrum.⁴⁴ If there is unused spectrum available, one option would be to add carriers, which is relatively inexpensive.⁴⁵ However, if the network is already utilizing all of the spectrum available to it, then this option will not be available and the network operator will have to turn other, costlier alternatives. For example, one such alternative could be to add new cell sites, which allows greater spectrum reuse.

47. Stated in economics terms, the need to rely on increasingly expensive options means that a service provider has an increasing marginal cost curve. That is, holding the amount of

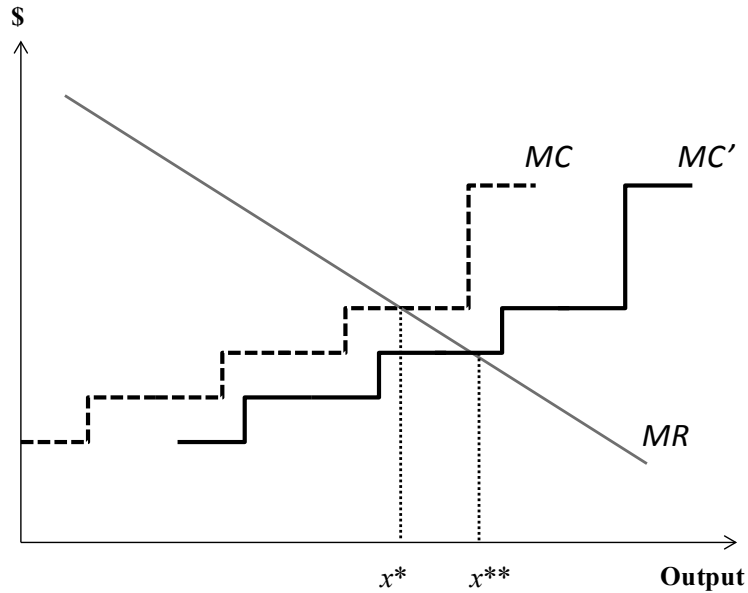
⁴⁴ *Stone Supplemental Declaration*, ¶¶ 41-48.

⁴⁵ *Stone Supplemental Declaration*, ¶ 44.

spectrum fixed, the cost of providing an additional unit of service rises as the total number of units of service being provided rises. Moreover, for a network operator such as Verizon Wireless, which is at the point that it has to employ costly options (*e.g.*, macro cell splits and the use of micro cells) to increase capacity, access to additional spectrum shifts its marginal cost curve downward because it allows the firm to avoid costlier options. For example, access to additional spectrum rights can lower a service provider's marginal costs by allowing it to increase the number of carriers rather than increasing the number of cell sites.⁴⁶ Figure 3 illustrates how additional spectrum actually shifts a network operator's cost curve. The dashed stair step is the service provider's marginal cost curve when it has access to the smaller amount of spectrum, and the solid stair step is the provider's marginal cost curve when it has access to the larger amount of spectrum.

⁴⁶ Of course, the costs of a spectrum license are a *long-run* incremental cost. An important point is that an optimizing firm will have lower incremental costs when it has access to a broader range of inputs.

Figure 3: Actual Impact of Additional Spectrum



48. Although the differences in the way additional spectrum access shifts the marginal cost curves in Figures 2 and 3 might not seem like much, there is a critical difference. The more realistic shift shown in Figure 3 leads to the intersection of marginal revenue and marginal cost shifting to the right (from x^* to x^{**}), and the firm chooses to produce additional output. In other words, the additional spectrum always leads the service provider to produce more output and, thus, benefits consumers. Professor Chevalier's model assumes this consumer benefit away.

49. Another way to see that Professor Chevalier's model is predicated on inappropriate assumptions about wireless production and cost functions is that she assumes that the increments of capacity made possible by access to additional spectrum get more and more expensive as a firm gains access to additional spectrum. But, in fact, incremental capacity

costs are lower once access to additional spectrum has been obtained; a network operator can add carriers instead of splitting cells, for example.⁴⁷

3. *Professor Chevalier's model fails to account for product differentiation.*

50. As noted above, Professor Chevalier's model assumes that all service providers offer identical products. In other words, the demand for any one service provider's output is the same as that for any other. The assumption that wireless services are perfectly undifferentiated products and all service providers face the same demand for their services is clearly contradicted by consumer behavior in the wireless marketplace. Consumers are willing to pay more for some services than others, and wireless service providers clearly face different degrees of demand for their services.

51. By assuming these differences away, the model does not recognize that a larger provider may face greater demand for its incremental output than does a smaller provider, with the result that the larger provider can have *greater* incentives to utilize incremental capacity, even if that capacity takes the unrealistic form assumed by Professor Chevalier's model.

4. *Professor Chevalier's model ignores the benefits of higher quality that consumers would enjoy.*

52. There is an important relationship between capacity utilization and quality that is absent from Professor Chevalier's model but that must be taken into account to conduct a

⁴⁷ Professor Chevalier's model also assumes that the costs of the incremental capacity associated with a given unit of spectrum access are the same for all carriers. However, a network operator with higher demand relative to its spectrum holdings would very likely see its marginal costs fall by a larger amount as the result of additional spectrum access.

proper competitive analysis. Because user demands in a given period of time fluctuate up and down, it is impractical and inefficient to build wireless networks that never become congested. At those times when demand exceeds network capacity, consumers will see quality suffer in terms of blocked or dropped calls and slower data rates. As a network with a given capacity serves more customers and carries more traffic on average, it becomes more likely that the network will be unable to meet the peak demands that it faces. Hence, as the average capacity utilization of the network increases, it becomes more likely that consumers will see quality suffer in terms of blocked or dropped calls and slowed data. Consequently, if a network adds capacity, its quality rises holding quantity fixed. This increase in quality is a consumer benefit that Professor Chevalier's model fails to recognize.

53. This is an important omission because quality is an important determinant of consumer welfare and because quality does not have the inframarginal-units effect that drives Professor Chevalier's results for quantities.⁴⁸ In Professor Chevalier's model, a given reduction in *quantity* that raises the market price is differentially attractive to a larger firm because that firm benefits from the price increase over a larger number of units.⁴⁹ To the extent that quality improvements are a fixed cost, the logic of Professor Chevalier's model implies that larger firms find it differentially attractive to raise *quality*. Even when there is a

⁴⁸ In general, the economics of quality levels can differ significantly from the economics of output levels. For example, although a monopoly producer typically sells too few units of output from an efficiency perspective, there is no theorem in economics stating that a monopolist will necessarily set quality inefficiently low. Indeed, there are well-established conditions under which a firm with market power may set quality inefficiently high. (See, e.g., A. Michael Spence (1975), "Monopoly, Quality, and Regulation," *Bell Journal of Economics* 6(2): 417-429.)

⁴⁹ *Chevalier Declaration*, Appendix B, at 2.

variable component to the cost of improving quality, a larger firm still might have greater incentives to raise quality than would a smaller one.

5. *Professor Chevalier's model is not calibrated to the wireless industry.*

54. Professor Chevalier makes no attempt to provide realistic numbers to see if her theory predicts anticompetitive warehousing in the wireless industry, and, indeed, she is careful not to make any claim that it does. However, the T-Mobile filing to which Professor Chevalier's declaration is attached does provide an indirect view of how the model would calibrate to the proposed license assignments.

55. T-Mobile's filing in this proceeding suggests that Professor Chevalier's model would predict that Verizon Wireless does *not* have incentives to engage in anticompetitive warehousing. T-Mobile asserts that "It is likely no coincidence that Verizon Wireless signed this deal while the AT&T/T-Mobile transaction was still pending, so that T-Mobile was unable to compete to purchase this spectrum."⁵⁰ In addition to serving as a reminder of how recently T-Mobile adopted the view that increased spectrum concentration is bad, this assertion undermines T-Mobile's claims that a large incumbent engaged in hoarding will be able to outbid a smaller rival. It also suggests that Professor Chevalier's model would predict that Verizon Wireless is planning to use the spectrum. This is so because Professor Chevalier's model implies that a larger incumbent might not outbid a smaller incumbent when both firms are planning to use the spectrum but that the larger incumbent will always outbid the smaller rival in the hoarding scenario. Hence, T-Mobile's apparent claim that it might

⁵⁰ *T-Mobile Petition* at 15.

have outbid Verizon Wireless in the secondary market indicates that Professor Chevalier's hoarding scenario does not apply.

IV. ATTEMPTS TO GERRYMANDER THE SPECTRUM SCREEN SHOULD BE REJECTED

56. A properly designed transaction screen can play a useful role in providing transparency and in reducing the social and private costs of transaction review by focusing attention on those geographic areas in which additional information would be most useful to making a proper assessment of the public-interest effects of a proposed transaction. However, a screen that focuses on the wrong criteria can harm consumer welfare and efficiency by: (a) supporting an incorrect decision to block a transaction that would otherwise benefit consumers, or (b) triggering unnecessary in-depth review that introduces uncertainty, cost, and delay into the license assignment process.

57. Several participants in this proceeding propose that the Commission should adopt a value-weighted spectrum aggregation screen (*i.e.*, a screen that places greater weight on spectrum licenses in bands that are more financially valuable by some measure).⁵¹ The *RCA Petition* proposes that spectrum below 1 GHz should be weighted more heavily and also

⁵¹ *Cramton Declaration*, ¶¶ 10, 20, 38. *See also T-Mobile Petition*, § IV.B; *RCA Petition*, § VII.B.ii; *Free Press Petition*, § III.A.

Although Sprint-Nextel does not offer specific proposals for a spectrum screen, it recommends that the Commission consider giving various bands of spectrum different weights when using concentration measures to assess competitive effects. (Comments of Sprint Nextel Corporation, *Application of Cellco Partnership d/b/a Verizon Wireless and SpectrumCo LLC For Consent To Assign Licenses and Application of Cellco Partnership d/b/a Verizon Wireless and Cox TMI Wireless, LLC, For Consent To Assign License*, WT Docket 12-4, February 21, 2012 (hereinafter *Sprint Nextel Comments*), §V.)

proposes that bands should be differentially weighted to account for alleged differences in their suitability for an LTE network.⁵²

58. Each of the specific proposals is seriously flawed and, thus, cannot serve as a useful tool for a case-by-case analysis. I discuss these proposals and their flaws in the remainder of this section.

A. THE SPECTRUM-SCREEN TRIGGER SHOULD BE RAISED NOT LOWERED.

59. RCA urges the Commission to lower the threshold amount of spectrum that would trigger the screen by: (a) reducing the total amount of spectrum considered in the base amount and (b) changing the triggering percentage. RTG seeks to place a *cap* of 110 MHz on license holdings for spectrum in bands below 2.3GHz,⁵³ which is less than the threshold amount of the current *screen* in areas where AWS-1 and BRS spectrum is incorporated in the base amount.⁵⁴ And Public Knowledge suggests that the Commission should evaluate the competitive effects of the transactions in all areas, whether or not the current screen is triggered – essentially arguing that the spectrum threshold should be lowered to 0 MHz.⁵⁵

60. RCA advocates eliminating two blocks of spectrum from the spectrum screen baseline.⁵⁶ The suggestions to lower the screen on this basis fail to take an appropriately

⁵² RCA Petition at 49.

⁵³ RTG Petition at 17-18.

⁵⁴ The Commission most recently based the spectrum threshold on the sum of cellular, PCS, SMR, and 700 MHz band spectrum, and included AWS-1 and BRS spectrum where available. (*In the Matter of Application of AT&T Inc. and Qualcomm Incorporated for Consent to Assign Licenses and Authorizations*, Order, (hereinafter, *AT&T-Qualcomm Order*), ¶ 39.) Thus the total spectrum used to calculate the screen varies by area and ranges from 280 to 422 MHz.

⁵⁵ Public Knowledge Petition, at 35.

⁵⁶ RCA Petition, §VII.C.

forward-looking view of the industry. Going forward, the spectrum used by other providers to compete with Verizon Wireless may well be broader than the Commission recognizes. For example, new entry may occur through unlicensed spectrum using a very different business model such as a ubiquitous WiFi network. In addition, such a network might have much greater spectrum reuse than a traditional macro-cell network, which means it could have more capacity per MHz than current technologies.

61. RCA also advocates shifting the trigger point in the screen from one-third of the relevant spectrum to one quarter.⁵⁷ The Commission's "one-third rule" is implicitly based on the false assumption that no service provider can successfully compete unless it holds licenses to at least as much spectrum as any other service provider. In reality, different service providers pursue different business models; two different providers may have significantly different spectrum needs while both compete successfully; and some service providers may be more successful than others for reasons that are independent of access to spectrum but that give rise to greater demand for spectrum by the more successful service provider. The Commission itself recognized this equal-assignment assumption is incorrect in its first application of the spectrum screen:⁵⁸

As an initial matter, although 70 MHz represents a little more than one-third of the total bandwidth available for mobile telephony today, we emphasize that a market may contain more than three viable competitors even where one entity controls this amount of spectrum, because many carriers are competing successfully with far lower amounts of bandwidth today.

⁵⁷ *RCA Petition*, §VII.C.

⁵⁸ *Applications of AT&T Wireless Services, Inc. and Cingular Wireless Corporation*, Memorandum Opinion and Order, 19 FCC Rcd 215122 (2004), ¶ 109.

Indeed, a market may contain four or more viable competitors even when two entities each controls more than one-third of the available spectrum. For example, using the Commission's most recent assessment of the amount of spectrum available for CMRS, even if there were two service providers each holding licenses covering 40 percent (169 MHz) of the base spectrum, two additional competitors could each have 42 MHz of spectrum.⁵⁹

62. Lastly, application of a one-third rule is particularly inapt in the present instance because the proposed transactions would have no effect on the number of competitors in any wireless market. The application of a one-quarter trigger would be even more inappropriate.

63. In summary, a move either to reduce the amount of spectrum under the screen or adopt a one-quarter rule would be a step in the wrong direction.

B. SUGGESTIONS FOR A WEIGHTED SCREEN ARE UNSOUND

64. Another set of proposals comprises several attempts to give some spectrum bands greater weight per megahertz than others in the spectrum aggregation screen.

1. *Dollar weighting schemes are severely flawed.*

65. Some proponents of a new weighting scheme advocate the use of dollar weights (*i.e.*, spectrum that sold at a higher price per megahertz, or that has a higher book value, would be

⁵⁹ The example in the text would apply in areas where both AWS-1 and BRS spectrum are available. (*In the Matter of Application of AT&T Inc. and Qualcomm Incorporated for Consent to Assign Licenses and Authorizations*, Order, (hereinafter, *AT&T-Qualcomm Order*), ¶ 39.) This is true of all the areas in which the proposed license assignments would cause Verizon Wireless's holdings to exceed the threshold. (Description of the Transaction and Public Interest Statement, *Application of Cellco Partnership d/b/a Verizon Wireless and SpectrumCo LLC For Consent To Assign Licenses*, WT Docket No. 12-04, December 16, 2012, Exhibit 5.)

given greater weight.)⁶⁰ Although it might have a superficial appearance of being “market-driven” this proposal is based on fundamental misunderstandings of: (a) the objective of competition policy, and (b) how markets operate.

66. The concern of competition policy is consumer welfare. To oversimplify somewhat, consumer welfare depends on outputs, not inputs. Hence, if the dollar values of spectrum license holdings are to be a useful measure of competitive conditions, then it is essential that there be a link between the value of spectrum license holdings and competition in the output market. Proponents of dollar weights have failed to put forth a valid explanation. Professor Cramton has attempted to offer such a theory, but it confuses harm to competitors with harm to competition. Specifically, his explanation of the link between competition and the concentration of “higher-value” (lower frequency) spectrum is the following:⁶¹

Unfortunately [Verizon Wireless’s] resulting domination in the low-frequency spectrum is not healthy for competition. It means that Verizon can provide better depth of coverage (inside buildings) and better breadth of coverage (in less populated areas) at much lower cost than smaller rivals. Customers value the better coverage and many switch to Verizon.

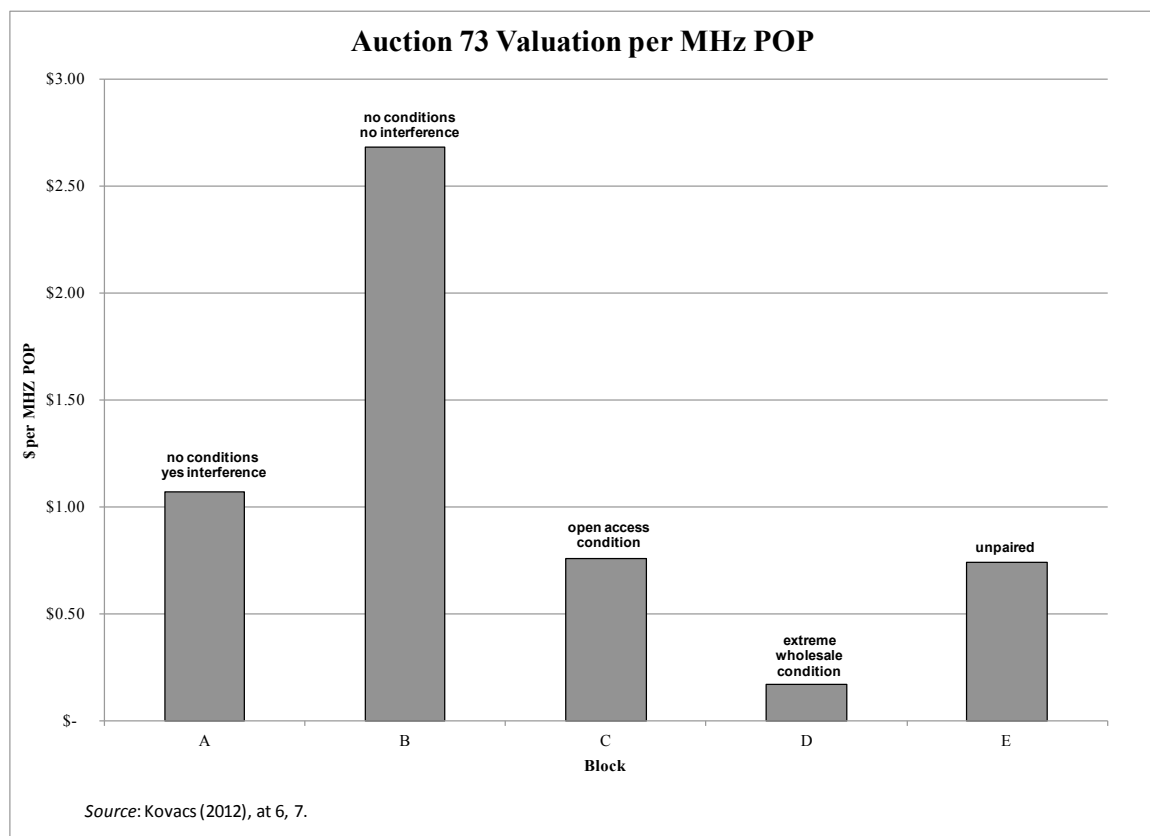
Despite the claimed focus on the health of competition, the only harm identified here is the harm to *competitors* who would find it difficult to compete with Verizon Wireless if it were able to provide superior services at lower cost due to the characteristics of its spectrum holdings. The relevance and validity of this justification are also called into question by the fact that Verizon Wireless’ “low-frequency spectrum” position is not changing in any way as a result of the proposed license assignments.

⁶⁰ *Free Press Petition* at 14-17; *Cramton Declaration*, ¶¶ 30-31.

⁶¹ *Cramton Declaration*, ¶ 24.

67. Next consider how proponents of a value-weighted screen misunderstand how markets operate. The per-MHz, per-POP price of a spectrum license reflects a wide variety of factors, including: the geographic scope of the license; the presence of incumbent users; projections of wireless demand and the possibility of future license primary auctions at the time of sale; public policy restrictions placed on the use of the spectrum; and spectrum propagation characteristics. Figure 4, which recreates a chart generated by Anna-Maria Kovacs, shows the wide range of prices paid in Auction 73. Manifestly, differences in propagation characteristics alone cannot explain these price differences.

Figure 4: A Comparison of License Prices



68. In order for there to be any logic underlying the use of a dollar-weighted scheme, one must establish that the wide range of factors that drive license prices or book values all are somehow indicative of the resulting competitive conditions. Not only have proponents of a dollar-weighted screen failed to establish any such relationship, proper economic analysis clearly indicates that prices or book values are extremely poor indexes of competitive implications.

69. To see the fundamental misunderstanding of markets inherent in calls for the use of a dollar-weighted screen, consider the following hypothetical example. Suppose *arguendo* that the only driver of the price difference between two licenses was the dollar amount of investment in network infrastructure needed to attain a given network capacity. In such a world: (a) a license that required more capital investment would sell for less, and (b) *the relative prices of two licenses would provide absolutely no information about the relative competitive importance of the two licenses*. Specifically, in a proper analysis of competitive effects, it is a matter of indifference whether a wireless service provider: (a) purchases spectrum for \$200 million and has to invest \$800 million in network facilities to produce one million units of service, or (b) purchases spectrum for \$600 million and has to invest \$400 million in network facilities to produce one million units of service. Either path leads to a competitor with the ability to supply one million units of service at a cost of one billion dollars.⁶² Yet proponents of a dollar-weighted screen would falsely assert that the supplier

⁶² A full analysis of this example would consider any differences in the service providers' marginal cost curves. Doing so would not change the fundamental conclusion presented in the text that the dollar value of a spectrum license is a poor indicator of its competitive importance. Depending on the nature of network investment, the firm with the lower-value

using the \$600-million spectrum is necessarily of three times greater competitive significance than is the supplier using the \$200-million spectrum.⁶³ Proponents of dollar weighting fail to recognize that the production of wireless services requires a mix of inputs.

70. In addition to the failings of dollar-weighted schemes described above, which are common to schemes based on license prices and schemes based on book values, each of these two types of dollar-weighted scheme has unique shortcomings of its own. For example, price-based schemes utilize weights reflecting market conditions at widely varying points in time, making the comparisons inherent in this type of weighting scheme inherently suspect. And book-value-based schemes are subject to differences in the financial accounting judgments of various license holders. As Sprint put it, there are “inherent limitations associated with spectrum book values, which reflect only each carrier’s self-assessment of the value of its spectrum holdings in a given period of time.”⁶⁴ It is difficult to imagine that differences in accounting judgments provide a meaningful index of competitive conditions.

2. *Other weighting schemes are also flawed.*

71. Some participants in this proceeding advocate other weighting schemes to capture differences that they perceive to exist in the utility of various blocks of spectrum in the

license could have lower marginal costs over a broad range of output levels than does the firm with the higher-value license.

⁶³ Indeed, as I discuss below, the higher frequencies derided by opponents to the license assignments actually have higher capacity-upsides than do lower frequencies even though the former often sell for less per MHz per-POP.

⁶⁴ Although it argues for the use of a book-value-based screen, “Sprint recognizes the inherent limitations associated with spectrum book values, which reflect only each carrier’s self-assessment of the value of its spectrum holdings in a given period of time.” (*Sprint Nextel Comments*, footnote 45.)

provision of mobile telecommunications services, particularly those delivered using LTE.⁶⁵

Proponents of weighting schemes based on differences in propagation characteristics overstate the disadvantages of higher frequencies while ignoring their advantages.⁶⁶ They also make incorrect statements about which bands are suitable for LTE and ignore the existence of global business ecosystems supporting the development of LTE in a variety of spectrum bands, as well as other 4G technologies.

72. Consider first suggestions to give lower frequencies greater weight. In its recent application of the spectrum screen to the AT&T-Qualcomm transaction, the Commission departed from its long-standing approach of treating all relevant spectrum equally⁶⁷ and stated that it looked “more closely” at holdings of spectrum in bands below 1 GHz.⁶⁸ The Commission attempted to support its decision by saying that⁶⁹

⁶⁵ See, e.g., *Free Press Petition* at 12-13; *RCA Petition* at 47-49.

⁶⁶ These proponents also ignore the fact that the spectrum involved in the proposed license assignments is not in one of the “beachfront” bands and, thus, under their view of the world should be of relatively little consequence for competition.

⁶⁷ *In the Matter of Applications of Celco Partnership d/b/a Verizon Wireless and Atlantis Holdings LLC For Consent to Transfer Control of Licenses, Authorizations, and Spectrum Manager and De Facto Transfer Leasing Arrangements and Petition for Declaratory Ruling that the Transaction is Consistent with Section 310(b)(4) of the Communications Act*, Memorandum Opinion and Order and Declaratory Ruling, 23 FCC Rcd 17444 (2008) (hereinafter, *Verizon-ALLTEL Order*), ¶ 69 (“Since the Commission first determined to evaluate potential spectrum aggregation of 800 MHz cellular spectrum, 800/900 MHz SMR, and 1.9 GHz broadband PCS spectrum for purposes of competitive review, it has not differentiated among these bands. Nor did we do so last year when we expanded the initial spectrum aggregation screen to include 700 MHz band spectrum. We decline to do so here with respect to the particular 2.5 GHz BRS spectrum or the 1.7/2.1 GHz AWS-1 spectrum that we find suitable for mobile telephony/broadband services.”).

⁶⁸ *AT&T-Qualcomm Order*, ¶ 31.

⁶⁹ *AT&T-Qualcomm Order*, ¶ 49.

The Commission also asserted that

Based on the record in this proceeding – and the Commission’s analysis in the Fifteenth Annual Mobile Wireless Competition Report – we find that it is prudent to inquire about the potential impact of AT&T’s aggregation of spectrum below 1 GHz as part of the Commission’s case-by-case analysis.

73. Yet the Commission’s claims of the higher cost for build out of higher frequencies made in the AT&T-Qualcomm proceeding are contradicted by the Fifteenth CMRS Competition Report. In that report, the Commission stated:⁷⁰

Although higher-frequency spectrum does not provide the same level of coverage or in-building penetration as lower-frequency spectrum, in some instances, *higher-frequency spectrum may be just as effective, or more effective, for providing significant capacity, or increasing capacity, within smaller geographic areas.* For instance, AT&T has noted that it cannot be assumed that lower frequency bands will require fewer cells or be more economical to deploy because other factors also affect propagation – including the presence of large buildings in urban areas or other physical impediments. In addition, capacity enhancement technologies such as multiple-input and multiple-output (MIMO) may perform better at higher frequencies. [Emphasis added.]

74. The text highlighted in this quotation is critical. As just discussed in Section IV.B.1, if spectrum license holdings are to be a useful measure of competitive conditions, then it is essential to understand the link between spectrum license holdings and competition in the output market. This quotation reveals that higher frequency may be *more* effective for generating output in dense markets, such as urban areas, in which the demand for mobile

Post-transaction, AT&T would hold a significant proportion of the available spectrum suitable for the provision of mobile voice or broadband services, particularly below 1 GHz spectrum, that has technical attributes important for other competitors to meaningfully expand their provision of mobile broadband services or for new entrants to have a potentially significant impact on competition. (*AT&T-Qualcomm Order*, ¶ 51.)

⁷⁰ Fifteenth Report, *In the Matter of Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993 Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services*, WT Docket No. 10-133, rel. June 27, 2011.

telecommunications services and, thus, the demand for spectrum allocated to mobile telecommunications services, is the greatest. Stated another way, a wireless service provider facing a rival with 20 MHz of high-frequency spectrum could well face a stronger competitive constraint than if it faced a rival with 20 MHz of lower-frequency spectrum because the former could have a greater ability to construct a higher-capacity, cost-effective network. Hence, proposals to give less weight to higher frequencies may be exactly backward.

75. The finding that high-frequency spectrum can be very effective accords with the following statement by Dr. John Saw, Chief Technology Officer of Clearwire. Clearwire has large holdings of spectrum licenses at 2.5 GHz. Dr. Saw has stated that⁷¹

Our extensive trial has clearly shown that our ‘LTE Advanced-ready’ network design, which leverages our deep spectrum with wide channels, can achieve far greater speeds and capacity than any other network that exists today. Clearwire is the only carrier with the unencumbered spectrum portfolio required to achieve this level of speed and capacity in the United States.

76. Next, consider the claims that Verizon Wireless has the ability to control wireless innovation ecosystems and, thus, its holdings drive which spectrum is valuable.⁷² These claims implicitly and incorrectly assert that wireless ecosystems stop at national borders. They do not. Wireless economic ecosystems are global in scope. For example, Clearwire’s Chief Technology Officer has stated that “the 2.5 GHz spectrum band in which we operate is widely allocated worldwide for 4G deployments, enabling a potentially robust, cost-effective and global ecosystem that could serve billions of devices.”⁷³ He also stated that “We

⁷¹ Clearwire, “Announcing the Future of LTE,” *available at* <http://www.clearwire.com/company/featured-story>, *site visited* February 26, 2012.

⁷² *RCA Petition*, §VIII.C.

⁷³ Clearwire, “Announcing the Future of LTE,” *available at* <http://www.clearwire.com/company/featured-story>, *site visited* February 26, 2012.


anticipate that the economies of scale derived from this global ecosystem will act as a catalyst for the development of thousands of low-cost devices and applications.”⁷⁴

77. In summary, the proposed changes to the spectrum aggregation screen based on “beachfront-property” claims will not improve the quality of the Commission’s review of license assignments. Instead, designing and applying a spectrum-weighting scheme would add needless delay and complexity to the screen and Commission review. These proposed changes should be rejected.

V. CONCLUSION

78. I have analyzed the central economic arguments made by opponents to the proposed license assignments. For the reasons described above, the Commission should reject these arguments.

I declare, under penalty of perjury, that the foregoing is true and correct.

A handwritten signature in black ink, appearing to read "Michael L. Katz", written over a horizontal line.

Michael L. Katz

March 1, 2012

⁷⁴ *Id.*

VI. APPENDIX: QUALIFICATIONS

79. I hold the Sarin Chair in Strategy and Leadership at the University of California at Berkeley. I hold a joint appointment in the Haas School of Business Administration and in the Department of Economics. At the Haas School, I serve as the Director of the Institute for Business Innovation. I have also served on the faculty of the Department of Economics at Princeton University and the Stern School of Business at New York University. I received my A.B. from Harvard University *summa cum laude* and my doctorate from Oxford University. Both degrees are in Economics.

80. I specialize in the economics of industrial organization, which includes the study of antitrust and regulatory policies. I regularly teach courses on microeconomics and business strategy. I am the co-author of a microeconomics textbook, and I have published numerous articles in academic journals and books. I have written academic articles on issues regarding the economics of network industries, two-sided markets, systems markets, and antitrust enforcement. My curriculum vitae is attached to this report as Tab 1. It lists all publications that I have authored or co-authored, with the exception of a few letters to the editor on telecommunications and antitrust policy. I am a co-editor of the *Journal of Economics and Management Strategy* and serve on the editorial boards of *Information Economics and Policy* and the *Journal of Industrial Economics*.

81. In addition to my academic experience, I have consulted on the application of economic analysis to issues of antitrust and regulatory policy. I have served as a consultant to both the U.S. Department of Justice and the Federal Communications Commission on issues of antitrust and regulatory policy. I have served as an expert witness before state and federal

courts. I have also provided expert testimony before a state regulatory commission and the U.S. Congress.

82. From January 1994 through January 1996, I served as the Chief Economist of the Federal Communications Commission. I participated in the formulation and analysis of policies toward all industries under Commission jurisdiction. As Chief Economist, I oversaw both qualitative and quantitative policy analyses.

83. From September 2001 through January 2003, I served as the Deputy Assistant Attorney General for Economic Analysis at the U.S. Department of Justice. I directed a staff of approximately fifty economists conducting analyses of economic issues arising in both merger and non-merger enforcement. My title as Deputy Assistant Attorney General notwithstanding, I am not an attorney.

84. I have also served on advisory panels related to spectrum policy issues. I served on the Committee on Wireless Technology Prospects and Policy Options for the Computer Science and Telecommunications Board of the National Research Council of the National Academies. This Committee examined innovation in wireless communications technologies and its implications for public policy toward spectrum allocation and assignment.

Exhibit 5

Other Holders of In-Screen Spectrum

**OTHER HOLDERS OF IN-SCREEN SPECTRUM
IN COUNTIES/PARISHES WHERE FCC SPECTRUM SCREEN IS TRIGGERED¹**

Alabama 4 – Bibb (CMA310) Spectrum Screen Triggered in 2 of 6 Counties (Bibb & Chilton) Post-Transactions: VZW Would Exceed Screen by 2 MHz	
County	Other “In-Screen” Spectrum Holders
Bibb	Total: 9 AT&T; Barat Wireless; C Spire; CenturyTel; Clearwire; DISH; SouthernLINC; Sprint; T-Mobile
Chilton	Total: 9 AT&T; Barat Wireless; C Spire; CenturyTel; Clearwire; DISH; SouthernLINC; Sprint; T-Mobile

Alabama 8 – Lee (CMA314) Spectrum Screen Triggered in 1 of 5 counties (Henry) Post-Transactions: VZW Would Exceed Screen by 2 MHz	
County	Other “In-Screen” Spectrum Holders
Henry	Total: 9 AT&T; Barat Wireless; CenturyTel; Clearwire; DISH; Public Service Wireless; SouthernLINC; Sprint; T-Mobile

Arkansas 11 – Hempstead (CMA334) Spectrum Screen Triggered in 1 of 4 counties (Hempstead) Post-Transactions: VZW Would Exceed Screen by 12 MHz	
County	Other “In-Screen” Spectrum Holders
Hempstead	Total: 7 AT&T; Barat Wireless; CenturyTel; Clearwire; DISH; Sprint; T-Mobile

¹ The term “In-Screen Spectrum” refers to spectrum in the following bands: Lower and Upper 700 MHz (80 MHz); Cellular (50 MHz); SMR (26.5 MHz); AWS-1 (90 MHz); Broadband PCS (120 MHz); and Broadband Radio Service (55.5 MHz). The data in this attachment is generally derived from Exhibit 7 to the Public Interest Statement filed in connection with the Verizon Wireless/SpectrumCo transaction (Lead Application File No. 0004993617), and assumes consummation of (1) the assignment of licenses from affiliates of Leap Wireless to Verizon Wireless, with respect to which applications are currently pending with the FCC (see FCC Public Notice, DA 11-2018 (rel. Dec. 14, 2011)), and (2) the transfer of control of licenses held by Redwood Wireless to AT&T, to which the Commission recently consented (see FCC Public Notice, Report No. 7478 (rel. Jan. 25, 2012)). References to DISH refer to spectrum held by its wholly-owned subsidiary Manifest Wireless LLC.

Louisiana 2 – Morehouse (CMA455) Spectrum Screen Triggered in 2 of 7 Parishes (Madison & Tensas) Post-Transactions: VZW Would Exceed Screen by 4 MHz	
Parish	Other “In-Screen” Spectrum Holders
Madison	Total: 9 AT&T; C Spire; CenturyTel; Clearwire; Command Connect; DISH; Sprint; T-Mobile; U.S. Cellular
Tensas	Total: 9 AT&T; C Spire; CenturyTel; Clearwire; Command Connect; DISH; Sprint; T-Mobile; U.S. Cellular

Grand Rapids, Michigan (CMA064) Spectrum Screen Triggered in Both Counties (Kent & Ottawa) Post-Transactions: VZW Would Exceed Screen by 4 MHz	
County	Other “In-Screen” Spectrum Holders
Kent	Total: 6 AT&T; Clearwire; DISH; MetroPCS; Sprint; T-Mobile
Ottawa	Total: 6 AT&T; Clearwire; DISH; MetroPCS; Sprint; T-Mobile

Lansing-East Lansing, MI (CMA078) Spectrum Screen Triggered in All Four Counties (Clinton, Eaton, Ingham & Ionia) Post-Transactions: VZW Would Exceed Screen by 9 MHz	
County	Other “In-Screen” Spectrum Holders
Clinton	Total: 6 AT&T; Clearwire; DISH; MetroPCS; Sprint; T-Mobile
Eaton	Total: 6 AT&T; Clearwire; DISH; MetroPCS; Sprint; T-Mobile
Ingham	Total: 6 AT&T; Clearwire; DISH; MetroPCS; Sprint; T-Mobile
Ionia	Total: 6 AT&T; Clearwire; DISH; MetroPCS; Sprint; T-Mobile

Saginaw-Bay City-Midland, MI (CMA094) Spectrum Screen Triggered in All Three Counties (Bay, Midland & Saginaw) Post-Transactions: VZW Would Exceed Screen by 9 MHz	
County	Other “In-Screen” Spectrum Holders
Bay	Total: 7 Agri-Valley; AT&T; DISH; MetroPCS; Speednet; Sprint; T-Mobile
Midland	Total: 7 Agri-Valley; AT&T; DISH; MetroPCS; Speednet; Sprint; T-Mobile
Saginaw	Total: 7 Agri-Valley; AT&T; DISH; MetroPCS; Speednet; Sprint; T-Mobile

Minneapolis-St. Paul, MN-WI (CMA015) Spectrum Screen Triggered in 6 of 10 Counties (Carver, Chisago, Dakota, Scott, Wright, MN & St. Croix, WI) Post-Transactions: VZW Would Exceed Screen by 19 MHz	
County	Other “In-Screen” Spectrum Holders
Carver	Total: 7 AT&T; Carroll Wireless; Clearwire; Cook Inlet; DISH; Sprint; T-Mobile
Chisago	Total: 7 AT&T; Carroll Wireless; Clearwire; Cook Inlet; DISH; Sprint; T-Mobile
Dakota	Total: 7 AT&T; Carroll Wireless; Clearwire; Cook Inlet; DISH; Sprint; T-Mobile
Scott	Total: 7 AT&T; Carroll Wireless; Clearwire; Cook Inlet; DISH; Sprint; T-Mobile
Wright	Total: 7 AT&T; Carroll Wireless; Clearwire; Cook Inlet; DISH; Sprint; T-Mobile
St. Croix	Total: 8 AT&T; Carroll Wireless; Clearwire; Cook Inlet; DISH; Sprint; T-Mobile; West Wisconsin Telephone

Minnesota 5 – Wilkin (CMA486) Spectrum Screen Triggered in 3 of 12 Counties (Big Stone, Swift & Traverse) Post-Transactions: VZW Would Exceed Screen by 2 MHz in Big Stone and Traverse, and by 4 MHz in Swift	
County	Other “In-Screen” Spectrum Holders
Big Stone	Total: 7 AT&T; DISH; LL License Holdings; SkyCom; Sprint; Swiftel; T-Mobile
Swift	Total: 8 AT&T; Clearwire; DISH; Savary Island; Sioux Falls PCS; SkyCom; Sprint; T-Mobile
Traverse	Total: 7 AT&T; DISH; LL License Holdings; SkyCom; Sprint; Swiftel; T-Mobile

Minnesota 8 – Lac qui Parle (CMA489) Spectrum Screen Triggered in 4 of 5 Counties (Lac qui Parle, Lincoln, Lyon & Yellow Medicine) Post-Transactions: VZW Would Exceed Screen by 4 MHz in Lac qui Parle, and by 14 MHz in Lincoln, Lyon & Yellow Medicine	
County	Other “In-Screen” Spectrum Holders
Lac qui Parle	Total: 9 AT&T; DISH; Long Lines; RC Technologies; Redwood Tel; Savary Island; Sioux Falls PCS; Sprint; T-Mobile
Lincoln	Total: 9 AT&T; DISH; Long Lines; Minnesota Valley TV; Redwood Tel; Savary Island; Sioux Falls PCS; Sprint; T-Mobile
Lyon	Total: 9 AT&T; DISH; Long Lines; Minnesota Valley TV; Redwood Tel; Savary Island; Sioux Falls PCS; Sprint; T-Mobile
Yellow Medicine	Total: 9 AT&T; DISH; Long Lines; Minnesota Valley TV; Redwood Tel; Savary Island; Sioux Falls PCS; Sprint; T-Mobile

Minnesota 9 – Pipestone (CMA490) – 2 of 9 counties Spectrum Screen Triggered in 2 of 9 Counties (Murray & Pipestone) Post-Transactions: VZW Would Exceed Screen by 7 MHz in Pipestone, and by 9 MHz in Murray	
County	Other “In-Screen” Spectrum Holders
Murray	Total: 9 AT&T; Clearwire; DISH; Long Lines; Redwood Tel; Savary Island; Sioux Falls PCS; Sprint; T-Mobile
Pipestone	Total: 7 AT&T; Clearwire; DISH; Long Lines; Sioux Falls PCS; Sprint; T-Mobile

Minnesota 11 – Goodhue (CMA492) Spectrum Screen Triggered in 4 of 7 Counties (Dodge, Fillmore, Mower & Wabasha) Post-Transactions: VZW Would Exceed Screen by 2 MHz in in Fillmore & Mower, and by 12 MHz in Dodge and Wabasha	
County	Other “In-Screen” Spectrum Holders
Dodge	Total: 10 AT&T; Clearwire; DISH; King Street; Midwest AWS; NEIT Wireless; Savary Island; Sprint; T-Mobile; U.S. Cellular
Fillmore	Total: 11 AT&T; Clearwire; DISH; King Street; Michigan Wireless; Midwest AWS; NEIT Wireless; Savary Island; Sprint; T-Mobile; U.S. Cellular
Mower	Total: 11 AT&T; Clearwire; DISH; King Street; Michigan Wireless; Midwest AWS; NEIT Wireless; Savary Island; Sprint; T-Mobile; U.S. Cellular
Wabasha	Total: 10 AT&T; Clearwire; DISH; King Street; Midwest AWS; NEIT Wireless; Savary Island; Sprint; T-Mobile; U.S. Cellular

Mississippi 4 – Yalobusha (CMA496) – 2 of 6 counties Spectrum Screen Triggered in 2 of 6 Counties (Calhoun & Monroe) Post-Transactions: VZW Would Exceed Screen by 2 MHz	
County	Other “In-Screen” Spectrum Holders
Calhoun	Total: 9 AT&T; Barat Wireless; C Spire; Cable One; CenturyTel; Clearwire; DISH; T-Mobile; Waller
Monroe	Total: 10 AT&T; Barat Wireless; C Spire; Cable One; CenturyTel; Clearwire; DISH; Sprint; T-Mobile; Waller

Missouri 9 – Bates (CMA512) Spectrum Screen Triggered in 1 of 5 Counties (Cedar) Post-Transactions: VZW Would Exceed Screen by 4 MHz	
County	Other “In-Screen” Spectrum Holders
Cedar	Total: 10 AT&T; Barat Wireless; CenturyTel; Clearwire; Commnet Midwest; DISH; Sprint; T-Mobile; TNA Mobile; U.S. Cellular

Raleigh-Durham, NC (CMA071) Spectrum Screen Triggered in All 3 Counties (Durham, Orange & Wake) Post-Transactions: VZW Would Exceed Screen by 9 MHz	
County	Other “In-Screen” Spectrum Holders
Durham	Total: 7 AT&T; Clearwire; DISH; King Street; Leap; Sprint; T-Mobile
Orange	Total: 7 AT&T; Clearwire; DISH; King Street; Leap; Sprint; T-Mobile
Wake	Total: 7 AT&T; Clearwire; DISH; King Street; Leap; Sprint; T-Mobile

Toledo, OH-MI (CMA048) Spectrum Screen Triggered in 4 of 5 Counties (Fulton, Lucas, Ottawa & Wood) Post-Transactions: VZW Would Exceed Screen by 2 MHz	
County	Other “In-Screen” Spectrum Holders
Fulton	Total: 7 Aloha Wireless; AT&T; Cavalier Wireless; Clearwire; DISH; Sprint; T-Mobile
Lucas	Total: 8 Aloha Wireless; AT&T; Cavalier Wireless; Clearwire; DISH; Revol; Sprint; T-Mobile
Ottawa	Total: 8 Aloha Wireless; AT&T; Cavalier Wireless; Clearwire; DISH; Revol; Sprint; T-Mobile
Wood	Total: 8 Aloha Wireless; AT&T; Cavalier Wireless; Clearwire; DISH; Revol; Sprint; T-Mobile

Florence, SC (CMA264) Spectrum Screen Triggered in the Sole County (Florence) Post-Transactions: VZW Would Exceed Screen by 7 MHz	
County	Other “In-Screen” Spectrum Holders
Florence	Total: 7 AT&T; Clearwire; DISH; FTC Management; Horry Telephone; Sprint; T-Mobile

Texas 7 – Fannin (CMA658) Spectrum Screen Triggered in 1 of 15 Counties (Cass) Post-Transactions: VZW Would Exceed Screen by 9 MHz	
County	Other “In-Screen” Spectrum Holders
Cass	Total: 8 Aloha Wireless; AT&T; Clearwire; DISH; MetroPCS; Peoples Telephone; Sprint; T-Mobile

Exhibit 6

Addendum Concerning the Commercial Agreements

ADDENDUM CONCERNING THE COMMERCIAL AGREEMENTS

For the reasons set forth in the Applicants’ Opposition, the Commercial Agreements are outside the scope of this license transfer proceeding, as well as the Commission’s jurisdiction.¹ For completeness, however, Applicants address the principal criticisms leveled by commenters against the Commercial Agreements. As explained below, commenters’ criticisms are factually and legally baseless and are not supported by Commission precedent. Indeed, although commenters profess concern that the Commercial Agreements may reduce competition or otherwise harm the public interest, many commenters – who are also competitors – are obviously concerned that the agreements will actually enhance competition and increase consumer choice to their detriment.

A. The Commercial Agreements Will Produce More Consumer Choice and Increased Competition, Not Facilitate Illegal Collusion

Several commenters speculate that the Commercial Agreements may facilitate “collusion” between Verizon Telecom and the MSOs.² These arguments are speculative and unfounded.

First, Verizon Telecom is not a party to the Commercial Agreements and will receive no information or data from the MSOs concerning the implementation of these agreements. The Commercial Agreements are between the MSOs and *Verizon Wireless*, not Verizon Wireless’s parent Verizon Communications or Verizon Telecom (which includes the entity that provides

¹ This Exhibit refers to Bright House Networks, Comcast Cable, Cox Communications, and Time Warner Cable collectively as the “MSOs,” and to the MSOs and Verizon Wireless together as “Applicants.” Except as otherwise indicated, all capitalized terms used herein have the meanings ascribed to them in the Opposition.

² Petition to Deny of T-Mobile, USA, Inc. (“T-Mobile”) at 18–20; Petition to Condition or Otherwise Deny Transactions of RCA – The Competitive Carriers Association (“RCA”) at 37; Petition to Deny of NTCH, Inc. (“NTCH”) at 11; Petition to Deny of Public Knowledge *et al.* (“Public Knowledge”) at 18–19.

FiOS). And the MSOs and Verizon Telecom each have strong incentives to prevent the exchange of commercially sensitive information as such exchanges could disadvantage them in the marketplace. For these reasons, and to ensure compliance with the antitrust laws, the Commercial Agreements incorporate provisions that **[BEGIN HIGHLY CONFIDENTIAL]**

[END HIGHLY

CONFIDENTIAL] The DOJ/FTC *Competitor Collaboration Guidelines* recognize that such safeguards and firewalls mitigate the risk of improper information sharing in joint ventures.⁴ Thus, there is no plausible basis on which to conclude that the Commercial Agreements will facilitate collusion between or among any competing businesses.⁵

Second, contrary to the suggestion of Public Knowledge and others, the composition of the board of the Innovation Technology Joint Venture will not serve as a basis for collusion.⁶ The Innovation Technology Joint Venture’s scope is limited to developing technologies that enable **[BEGIN HIGHLY CONFIDENTIAL]**

³ **[BEGIN HIGHLY CONFIDENTIAL]**

[END HIGHLY

CONFIDENTIAL]

⁴ Dep’t of Justice & Fed. Trade Comm’n, ANTITRUST GUIDELINES FOR COLLABORATIONS AMONG COMPETITORS § 3.34(e) (2000), <http://www.ftc.gov/os/2000/04/ftcdojguidelines.pdf>.

⁵ For example, the DOJ concluded that Movielink – a joint venture of Sony (Columbia-TriStar Pictures), Warner Bros., MGM, Paramount, and Universal to provide video-on-demand services – was unlikely to facilitate improper collusion among competitors. *See* Press Release, Dep’t of Justice, Justice Department Closes Antitrust Investigation into the Movielink Movies-On-Demand Joint Venture (June 3, 2004), http://www.justice.gov/atr/public/press_releases/2004/203932.htm.

⁶ Public Knowledge Confidential Appendix at A-3; *see* Comments of DIRECTV, LLC (“DIRECTV”) at 4 (claiming that the Innovation Technology Joint Venture provides “a ready-made forum for sharing information and coordinating strategies”); Petition to Deny or Condition Assignment of Licenses of Hawaiian Telcom Communications, Inc. (“Hawaiian Telcom”) at 18–20.

[END HIGHLY CONFIDENTIAL]

Third, instead of harming competition, the Commercial Agreements will provide more choice and convenience, increased competition, and greater investment and innovation in next-generation technology. The agency arrangements provide the MSOs and Verizon Wireless with a quick and efficient path to offer their customers the convenience of a “one-stop shop” for video, high-speed data, digital voice, and wireless services. Today, AT&T, DIRECTV, Dish Network, CenturyLink, and others offer multi-product bundles. The Commercial Agreements allow the MSOs and Verizon Wireless to respond to this competition with a top-notch suite of products of their own.⁹ This, in turn, will prompt competitive responses from other providers, all of which advances consumer welfare.¹⁰ Many commenters, who are also competitors of the

⁷ **[BEGIN HIGHLY CONFIDENTIAL]**

[END HIGHLY CONFIDENTIAL]

⁸ **[BEGIN HIGHLY CONFIDENTIAL]**
CONFIDENTIAL]

[END HIGHLY

⁹ *See e.g.*, Comments of Free State Foundation at 10 (“We believe that the commercial agreements may offer public benefits, for example, through increased consumer choice through new bundled packages of services that otherwise would not be available, or not be available as conveniently on a one-stop basis.”).

¹⁰ *See e.g.*, Comments of Technology Policy Institute (“Technology Policy Institute”) at 16 (“If this additional marketing (or additional value of the wireless bundle) makes cable more attractive, then other providers, such as AT&T, may be forced to upgrade their offerings or reduce prices to stay competitive.”).

Applicants, fear that increased competition will diminish their profits, but the public interest calculus, like the antitrust laws, focuses on “the protection of competition, not competitors.”¹¹

The Reseller Agreements will likewise increase competition and provide consumers with additional choice, convenience, and savings. If and when the MSOs exercise their reseller option, then customers will have a new option to select a bundle of offerings that includes branded wireless service from the MSOs, along with the MSOs’ video, voice, and high-speed data services. The Commission has recognized that reseller agreements exert pro-competitive pressure.¹² Here, the Reseller Agreements will allow the MSOs to compete more effectively against Verizon Telecom, the companies identified in the preceding paragraph, and others that already offer “quad play” bundles.

Likewise, the Joint Venture will benefit competition and the public interest by allowing Verizon Wireless and the MSOs to develop next-generation technologies that will enhance consumers’ communications and media experiences. In so doing, Verizon Wireless and the MSOs will join a race to develop integrated services in which other technology companies, such as Apple, Google, and Microsoft, are already making technological advances.

¹¹ See, e.g., *Applications of OTI Corp., and Its Shareholders, Transferors, and MCI Communications Corp., and MCI/OTI Corp., Transferees*, Order, 6 FCC Rcd 1611, 1612 ¶ 13 (CCB rel. Mar. 14, 1991) (quoting *Brown Shoe Co. v. United States*, 370 U.S. 294, 320 (1962)).

¹² See, e.g., *Applications of Cellco Partnership d/b/a Verizon Wireless and AT&T, Inc. for Consent to Assign or Transfer Control of Licenses and Authorizations and Request for Declaratory Ruling on Foreign Ownership*, Memorandum Opinion and Order and Declaratory Ruling, 25 FCC Rcd 10985, 11002 ¶ 36 (2010); *Applications of AT&T Inc. and Centennial Communications Corp. for Consent to Transfer Control of Licenses, Authorizations, and Spectrum Leasing Arrangements*, Memorandum Opinion and Order, 24 FCC Rcd 13915, 13936 ¶ 45 (2009); *Applications of Nextel Communications, Inc. and Sprint Corporation for Consent to Transfer Control of Licenses and Authorizations*, Memorandum Opinion and Order, 20 FCC Rcd 13967, 14000 ¶ 88 (2005) (“MVNOs and resellers . . . may provide additional constraints against anticompetitive behavior. In particular, independent resellers and MVNOs may be able to undercut the market leaders and thereby provide an additional constraint on coordinated interaction[.]”).

B. The Commercial Agreements Do Not Form a “Cartel”

Certain commenters argue that the Commercial Agreements are actually an attempt by the Applicants to form a “cartel.”¹³ For example, the Rural Telecommunications Group (“RTG”) asserts that the Innovation Technology Joint Venture “is a vehicle for Verizon [Telecom] to abandon its role as a competitor to the cable companies on the ‘wired’ side of the equation by allowing the fast-growing Verizon Wireless to collude with the [MSOs].”¹⁴

A cartel, however, is “[a] combination of producers or sellers that join together to control a product’s production or price.”¹⁵ Nothing in the Agency Agreements, the Reseller Agreements, or the Innovation Technology Joint Venture, however, will allow the MSOs or Verizon Wireless to control the production or price of the other’s products.

The Agency Agreements merely authorize the MSOs and Verizon Wireless to act as sales *agents* for one another – with pricing established in the sole discretion of the principal.¹⁶ Indeed, the Agency Agreements *expressly prevent* the parties from exercising any control or management responsibilities over one another’s businesses.¹⁷ Once the sales agent completes the

¹³ *E.g.*, Petition to Deny of Free Press (“Free Press”) at 38, 41–43.

¹⁴ Petition to Deny of Rural Telecommunications Group (“RTG”) at 27; *see* Hawaiian Telcom at 17 (stating that “the transaction may be viewed as an allocation of markets” among the MSOs, Verizon and Verizon Wireless).

¹⁵ *Freedom Holdings, Inc. v. Spitzer*, 447 F. Supp. 2d 230, 251 (S.D.N.Y. 2004) (quoting BLACK’S LAW DICTIONARY 206 (7th ed. 1999)) (internal quotation marks omitted); *accord* IIA PHILIP E. AREEDA & HERBERT HOVENKAMP, ANTITRUST LAW ¶ 405a, at 26 (2d ed. 2002) (“Competing firms form a cartel when they replace independent decisions with an *agreement on price, output, or related matters.*” (emphasis added)).

¹⁶ *Major League Baseball Props., Inc. v. Salvino, Inc.*, 542 F.3d 290, 318 (2d Cir. 2008) (rejecting plaintiff’s attempt to characterize an agency agreement as a cartel and explaining that, unlike cartels, which ordinarily result in reductions of output, agency agreements often result in expansion of output).

¹⁷ [BEGIN HIGHLY CONFIDENTIAL]

sale, the subscriber becomes the customer of the principal – *not* a customer of the agent.¹⁸ These types of sales agency arrangements are pervasive in the telecommunications industry and have never been characterized as constituting a “cartel.”¹⁹

The Reseller Agreements likewise do not afford any party the right to control the production or price of another’s products. Once the Reseller Agreements are executed and implemented, the MSOs will simply purchase Verizon Wireless service on the wholesale level and resell it at the retail level. The MSOs will bear sole responsibility for and retain sole control over all aspects of their resale businesses.²⁰ As a mere supplier, Verizon Wireless will neither

END HIGHLY CONFIDENTIAL]

¹⁸ *See, e.g.*, Comcast Agent Agreement § 2.13; VZW Agent Agreement (Comcast) § 2.10.
[BEGIN HIGHLY CONFIDENTIAL]

[END HIGHLY CONFIDENTIAL]

¹⁹ *See, e.g.*, Press Release, DIRECTV, AT&T and DIRECTV Sign Three-Year Extension Agreement to Deliver AT&T / DIRECTV to AT&T Customers (Nov. 3, 2011), <http://investor.directv.com/releasedetail.cfm?ReleaseID=620738>; Press Release, CenturyLink, Inc., DIRECTV and CenturyLink Sign Agreement to Offer Video Services to CenturyLink Customers (Aug. 12, 2010), <http://news.centurylink.com/index.php?s=43&item=57>; Press Release, Frontier Commc’ns Corp., Frontier Communications Teams with AT&T to Offer Wireless Voice and Data Products (Nov. 15, 2011), <http://phx.corporate-ir.net/phoenix.zhtml?c=66508&p=irol-newsArticle&ID=1630726&highlight=>; Press Release, SBC Commc’ns, Inc., SBC Communications, EchoStar Forge Strategic Partnership, Will Offer "SBC Dish Network" Television Service (Jul. 21, 2003), <http://www.att.com/gen/press-room?pid=4800&cdvn=news&newsarticleid=20557>; Natalie Weinstein, CNET NEWS, *AT&T Drops Dish for DirecTV* (Sept. 27, 2008), http://news.cnet.com/8301-1035_3-10052944-94.html; Marguerite Reardon, CNET NEWS, *AT&T Ends Dish Satellite TV Partnership* (Jul. 2, 2008), http://news.cnet.com/8301-10784_3-9982808-7.html.

²⁰ *See, e.g.*, Comcast Reseller Agreement § 5.3.
[BEGIN HIGHLY CONFIDENTIAL]

exercise control over the MSOs’ resale businesses nor share in the profits or losses of those businesses.

The Innovation Technology Joint Venture also does not constitute a cartel controlling the price, sales, or content of the Applicants’ products. Indeed, the Innovation Technology Joint Venture will not sell any of the Applicants’ existing services – whether wireline or wireless – or license or distribute content. Instead, the Innovation Technology Joint Venture will attempt to develop new technologies and intellectual property for “the integration of wireline video, voice, and high-speed data services with wireless technologies.”²¹ The Innovation Technology Joint Venture may license these technologies to others – thereby *increasing* the potential consumer benefits from the participants’ investments.

C. Verizon Will Continue to Compete Vigorously with the MSOs Regardless of the Commercial Agreements

Several commenters argue that the Commercial Agreements will diminish Verizon’s incentive to compete with the MSOs within the FiOS footprint.²² RTG, for example, argues that the Commercial Agreements give Verizon “a strong incentive . . . to stop delivering voice, Internet and video services via wires because it can reap those same benefits through Verizon Wireless entering into [the Commercial Agreements] with the . . . MSOs.”²³ This purported competitive harm is confined to a limited geographic area: FiOS is not even available in

[END HIGHLY CONFIDENTIAL]

²¹ **[BEGIN HIGHLY CONFIDENTIAL]**
[END HIGHLY CONFIDENTIAL]

²² See Comments of International Brotherhood of Electrical Workers, Local 827 and System Council T-6 (“IBEW Local 827”) at 11; T-Mobile at 19.

²³ RTG at 28.

approximately eighty-five percent of the areas where the MSOs offer services. More important, such arguments ignore economic and business realities.

As an initial matter, Verizon is committed to FiOS, which has become an important growth engine for the company. Verizon has invested over \$23 billion in capital into its FiOS buildout, and grown the FiOS business from nothing in 2004 to an \$8.2 billion annual revenue business today. Verizon Telecom currently has approximately 4.2 million FiOS TV and 4.8 million FiOS Internet subscribers.²⁴ FiOS revenues now represent 61% of Verizon Telecom's wireline consumer revenues, and grew 18.2% over the last year alone.²⁵ And FiOS is growing by taking market share from its competitors – FiOS increased its market penetration in both TV and Internet by roughly 4% over the last year alone. Verizon's publicly stated strategy is to continue increasing FiOS' market share, since having more customers over the same shared plant increases FiOS' – and thus Verizon's – profitability. With the substantial initial investments in FiOS now largely complete, this product has become an ever growing source of positive cash flow for the company.

The Commercial Agreements in no way alter Verizon's commitment to FiOS. Verizon Wireless will not favor the MSOs over FiOS in its marketing and sales efforts, and customers will continue to choose among FiOS, the MSOs, and their competitors based on the merits of their services. Verizon will every have every incentive to offer attractive services on competitive terms.

Basic economics confirms that Verizon would only injure itself if it “pulled its punches” in competition with the MSOs. Each FiOS subscriber provides Verizon an ongoing monthly

²⁴ Verizon, *Verizon Communications Investor Quarterly 4Q 2011* at 14 (Jan. 24, 2012), available at http://www22.verizon.com/idc/groups/public/documents/adacct/2011_4q_quarterly_bulletin.pdf.

²⁵ *Id.*

revenue stream worth many thousands of dollars. By contrast, Verizon Wireless stands to earn

[BEGIN HIGHLY CONFIDENTIAL]

[END HIGHLY CONFIDENTIAL] if a subscriber signs up for service with an MVPD other than FiOS, and then only if (1) the subscriber signs up for service with the MSOs, rather than other MVPDs, and (2) does so through Verizon Wireless, as opposed to signing up with the MSOs directly or through other sales agents. Moreover, Verizon owns only 55% of Verizon Wireless and would therefore receive only the benefit of that fraction of any commissions Verizon Wireless earns.²⁶

Simply put, it would be economically irrational for Verizon to forego further increased FiOS market share gains, with resulting recurring revenue and margin hits to FiOS, in return for some small one-time commission payments to Verizon Wireless (only 55% owned by Verizon). The Commercial Agreements simply do not and will not create any incentives for Verizon to increase the prices or otherwise reduce competition in the sale and marketing of its wireline services.

D. Verizon Telecom’s Incentives with Respect to Expansion of the FiOS Footprint Are Not Materially Affected by the Commercial Agreements

Certain commenters assert that the Commercial Agreements will discourage Verizon from undertaking an expansion of the FiOS footprint that it would have undertaken but for these

²⁶ Even this analysis significantly overstates the likelihood that the Commercial Agreements will result in higher prices or weaker competition from FiOS services. As an initial matter, it is highly improbable that the managers responsible for Verizon Telecom’s FiOS business will sabotage that business even in the unlikely event that doing so would generate appreciable commissions for Verizon Wireless. In addition, Verizon has traditionally set the prices for FiOS services on a nationwide basis. Unless Verizon were willing to depart from these pricing practices, any price increase would result in loss of FiOS subscribers nationwide, but only possibly result in partially offsetting commissions in the limited geographies in which the FiOS and MSOs’ footprints overlap.

agreements.²⁷ These assertions are baseless. As explained below, potential expansion of the FiOS footprint can be divided into two categories: (i) expansion in local franchise areas (“LFAs”) where FiOS is already present and (ii) expansion in LFAs where FiOS has no presence or regulatory approval to operate. The Commercial Agreements will not have a meaningful impact on Verizon Telecom’s plans to undertake either category of FiOS-footprint expansion.

First, Verizon Telecom has substantial, existing legal commitments to build out FiOS in the LFAs where it is already present. The Commercial Agreements have no impact on these legal obligations of Verizon Telecom.

Second, the Commercial Agreements will not affect Verizon’s incentives to expand the FiOS footprint to LFAs in which FiOS is not already present, because Verizon already had decided to end substantial new capital investment in FiOS in new markets *over two years ago* – well before Verizon Wireless entered into the Commercial Agreements. In particular, beginning in mid-2009, Verizon announced that it had no present plans to expand the FiOS footprint:

- On a July 27, 2009 earnings call, for example, Verizon CFO John Killian stated that Verizon was “on track to be substantially finished with [FiOS] deployment by the end of 2010, which has positive implications for both capital spending and free cash flow.”²⁸
- On September 10, 2009, Mr. Killian reiterated that Verizon would “be substantially done with [its FiOS build out] at the end of 2010.”²⁹

²⁷ *E.g.*, Public Knowledge at 22–23; Comments of the Communications Workers of America and the International Brotherhood of Electrical Workers (“CWA & IBEW”) at 6; IBEW Local 827 at 6.

²⁸ John Killian, Executive Vice President & Chief Financial Officer, Verizon, Q2 2009 Verizon Earnings Conference Call at 5 (Jul. 27, 2009), *available at* http://www22.verizon.com/idc/groups/public/documents/adacct/event_895_trans.pdf.

²⁹ John Killian, Executive Vice President & Chief Financial Officer, Verizon, Verizon at Bank of America Securities Media, Communications & Entertainment Conference at 6 (Sept. 10, 2009), *available at* http://www22.verizon.com/idc/groups/public/documents/adacct/event_905_trans.pdf.

- On October 26, 2009, Mr. Killian again stated that Verizon would “substantially complete [its] FiOS build program by the end of 2010, which alone should result in about \$2 billion of capital savings each year.”³⁰

As Mr. Killian noted, Verizon chose to generate free cash flow by slowing capital spending and focusing instead on market share gains in areas where capital had been spent.³¹ Commenters’ speculative argument that at some point Verizon, absent the Commercial Agreements, would reverse its current plan of record and spend billions more in scarce capital to further expand the FiOS footprint – beyond the expansion it is already undertaking – is completely baseless.

Third, basic economics suggests that the Commercial Agreements will have no discernible impact on Verizon Telecom’s incentives and disincentives to expand the FiOS footprint. Any commissions received by Verizon Wireless for sales of MSO services represent a fraction of the net present value of a Verizon Telecom FiOS subscriber. It is highly unlikely that the loss of these commissions (only 55% of which would flow to Verizon) would turn an otherwise profitable investment in FiOS expansion into an unprofitable one. No commenter has submitted an economic analysis suggesting any other result.

³⁰ John Killian, Executive Vice President & Chief Financial Officer, Verizon, Q3 2009 Verizon Earnings Conference Call at 6 (Oct. 26, 2009), *available at* http://www22.verizon.com/idc/groups/public/documents/adacct/event_917_trans.pdf; Marguerite Reardon, CNET NEWS, *Verizon Nears FiOS Network Completion* (Mar. 29, 2010), http://news.cnet.com/8301-30686_3-20001377-266.html (“Verizon Communications is nearly finished building its FiOS fiber-to-the-home network.”); Peter Svensson, USA TODAY, *Verizon winds down expensive FiOS expansion* (Mar. 26, 2010), http://www.usatoday.com/money/industries/telecom/2010-03-26-verizon-fios_N.htm (“Verizon is nearing the end of its program to replace copper phone lines with optical fibers that provide much higher Internet speeds and TV service.”).

³¹ See John Killian, Executive Vice President & Chief Financial Officer, Verizon, Q3 2009 Verizon Earnings Conference Call at 5–6 (Oct. 26, 2009), *available at* http://www22.verizon.com/idc/groups/public/documents/adacct/event_917_trans.pdf.

E. The Agency and Reseller Agreements Do Not Eliminate Actual or Potential Wireless Competition from the MSOs

Some commenters speculated that the MSOs would have become facilities-based wireless competitors but for the spectrum sale and the Commercial Agreements.³² The Rural Telecommunications Group claims, for example, that these agreements remove the MSOs “as potential facilities-based mobile wireless competitors” and thereby “place even greater negotiating power in the hands of Verizon Wireless.”³³

Such conjecture about “potential competition” is insufficient to support a plausible theory of competitive harm.³⁴ As detailed in the Opposition, the MSOs faced significant challenges in attempting to operate as a facilities-based mobile telephony/broadband service provider with the 20 MHz of spectrum that they hold.³⁵ Among other things, the MSOs do not currently operate any meaningful wireless network, and SpectrumCo and Cox have concluded that the costs and risks of building an independent network robust enough to provide the increasingly data-rich

³² RCA at 37–38; Public Knowledge at 22.

³³ RTG at 11–12.

³⁴ See, e.g., *In re Applications of Pacific Telesis Group, Transferor, and SBC Communications, Inc., Transferee for Consent to Transfer Control of Pacific Telesis Group and its Subsidiaries*, Memorandum Opinion and Order, 12 FCC Rcd 2624, 2637 ¶ 25 (rel. Jan. 31, 1997) (concluding that opponents of the proposed transfer had not shown that it would be anti-competitive on a potential-competition theory where it was possible that SBC “would have entered the markets in question but for the proposed transfer,” but it was “at least equally plausible that SBC’s economic incentives [were], rather, to devote its capital to entering new product markets in its own region”). The U.S. Supreme Court has similarly recognized the damage that may result from enjoining a transaction based on speculative theories of harm to “potential competition.” Thus, the Court has held that, before a theory of potential competition may be applied to invalidate a transaction under Section 7 of the Clayton Act, the plaintiff must demonstrate, among other things, a “substantial likelihood of procompetitive loss.” *United States v. Marine Bancorp. Inc.*, 418 U.S. 602, 637 (1974). To preliminarily enjoin a transaction under such a theory, “the Government must do far more than merely raise sufficiently serious questions with respect to the merits to make them a fair ground for litigation.” *United States v. Siemens Corp.*, 621 F.2d 499, 506 (2d Cir. 1980).

³⁵ Opposition at §§ I.E.1, I.E.2; see also Public Interest Statement at 20–23.

services desired by wireless consumers today are unacceptably high. Indeed, Cox actually constructed a facilities-based network in two markets but never offered commercial facilities-based service in any of its markets, and decommissioned its network after it became clear that it would be unable to deploy its service without sustaining unacceptably large losses.³⁶ After exhaustively studying and evaluating its options for providing consumers with wireless service, SpectrumCo concluded that the costs and risks of building a wireless network – possible capital expenditures and cumulative negative net operating costs of roughly \$10–11 billion – were substantial.³⁷ Based on their analyses, SpectrumCo’s members and Cox reasonably concluded that the Agency and Reseller Agreements with Verizon Wireless would deliver more service choices to consumers much faster than any other option.³⁸ There is no basis in the communications laws or antitrust laws to compel companies to make investments in businesses when they have independently concluded that such investments would be unprofitable.

Unlike the proposed AT&T/T-Mobile transaction, the Agency and Reseller Agreements do not result in the elimination of any present (or foreseeable) wireless competition. Consumers will continue to have the same number of choices among wireless service providers as they did before these agreements were implemented. Should any MSO ultimately become a wireless reseller, as provided for in the Reseller Agreements, consumers will gain an additional, separately branded choice among wireless providers.

³⁶ Opposition at § I.E.2; Declaration of Suzanne Fenwick ¶¶ 5, 7; Press Release, Cox Commc’ns, Cox Communications to Discontinue Cox Wireless Service, Effective March 30, 2012 (Nov. 15, 2011), <http://cox.mediaroom.com/index.php?s=43&item=569>; Mike Robuck, *Cox to Shut Down Wireless Service*, CED MAGAZINE, Nov. 16, 2011, <http://www.cedmagazine.com/news/2011/11/cox-to-shut-down-wireless-service>.

³⁷ Opposition at § I.E.1; *see* Declaration of Robert Pick ¶¶ 10–16.

³⁸ Opposition at § I.E.1; *see* Declaration of Robert Pick ¶¶ 10–16.

F. Other Competitors Can Continue to Offer Multi-Product Bundles Regardless of the Agency and Reseller Agreements

Certain commenters argue that the Agency and Reseller Agreements will harm competition by precluding other competitors from offering multi-product bundles.³⁹ This argument too fails to state a plausible harm to competition.

First, the Agency and Reseller Agreements will not preclude other competitors from offering multi-product bundles. The relevant markets are highly competitive; for example, consumers typically enjoy a choice among several wireless providers and MVPDs, including two direct broadcast satellite providers. Wireless service providers and MVPDs therefore can create – and indeed have created – their own exclusive multi-product bundles by combining their offerings.⁴⁰

Second, the exclusivity provisions contained in the Agency and Reseller Agreements are necessary to ensure the pro-competitive benefits of those agreements. These agreements cannot be successful unless the parties remain committed to their success; the exclusivity provisions are needed to ensure this commitment.⁴¹ Indeed, other sales partnerships in the relevant markets – including partnerships that DIRECTV has entered into with AT&T and Verizon Telecom – have incorporated exclusivity provisions, without any objection from the Commission or the antitrust

³⁹ *E.g.*, NTCH at 11.

⁴⁰ *E.g.*, Press Release, DIRECTV, AT&T and DIRECTV Sign Three-Year Extension Agreement to Deliver AT&T | DIRECTV Service to AT&T Customers (Nov. 3, 2011), <http://news.directv.com/2011/11/03/att-and-directv-sign-three-year-extension-agreement-to-deliver-att-directv-service-to-att-customers/>.

⁴¹ *See Roland Machinery Co. v. Dresser Indus., Inc.*, 749 F.2d 380, 395 (7th Cir. 1984) (Posner, J.) (explaining that exclusive arrangements often prevent free riding).

authorities. The antitrust laws recognize that exclusivity commitments are common in agency agreements and frequently enhance the procompetitive benefits of such agreements.⁴²

Third, while some providers offer multi-product bundles that include wireless and wireline services, such offerings are not a prerequisite for participation in the communications marketplace. For example, while Sprint and the MSOs have offered bundles that feature wireless and wireline services, those bundles have historically not accounted for a material percentage of Sprint's or the MSOs' subscribers.⁴³ And other providers, such as Cricket Wireless, continue to focus on offering services that consumers can purchase on a stand-alone basis.⁴⁴ Stand-alone-service providers will remain vital competitors because consumer can and do create their own bundles of wireless and wireline services from selecting services from different providers.⁴⁵ These consumer-created bundles compete against providers' own multi-product bundles, and the Commercial Agreements in no way alter this dynamic.

Fourth, to the extent certain commenters complain that the Agency and Reseller Agreements will adversely affect other competitors by improving Applicants' product offerings (such as by offering discounts or other benefits as Comcast and Verizon Wireless have already

⁴² See, e.g., Sheila F. Anthony, Commissioner, FTC, Vertical Issues in Federal Antitrust Law (Mar. 19, 1998) (explaining that an exclusivity commitment "may be procompetitive when it encourages retailers to invest in promoting the manufacturer's line, thereby enhancing *interbrand* competition at the retail level"), available at <http://www.ftc.gov/speeches/anthony/aliabaps.shtm>.

⁴³ See, e.g., Erica Ogg, CNET NEWS, *Comcast Walks Away from Pivot* (Apr. 23, 2008), http://news.cnet.com/8301-10784_3-9927428-7.html (explaining that "[b]y the end of [2007], demand was so low for Pivot [a partnership between Sprint and the MSOs] that they stopped marketing it").

⁴⁴ Cricket Wireless, Company Information, <http://www.mycricket.com/learn/cricket-wireless>; Alex Pham, LOS ANGELES TIMES, *Cricket Wireless has the Music Industry Feeling Chirpy* (Feb. 7, 2012), <http://www.latimes.com/business/la-fi-ct-cricket-20120207,0,2200481.story> (explaining how Cricket Wireless customers appeal to individuals whose cell phones, not computers, "are the center of their digital lives").

⁴⁵ See Ogg, *supra* note 43 (explaining that "[p]art of [Pivot's] problem [was] that nearly 80 percent of U.S. residents already subscribe to a cell phone service").

done in Seattle, Portland, and San Francisco) and forcing their competitors to offer lower prices or improved services,⁴⁶ these effects *promote* competition, *benefit* consumers, and *further* the public interest. These commenters appear to be advancing a form of an “efficiencies offense” (i.e., an objection to a transaction because it increases efficiency). Such an “efficiencies offense” has been categorically rejected and would turn both the antitrust laws and communications laws on their heads.⁴⁷

G. The Innovation Technology Joint Venture Will Enhance, Not Impede, Competition for Wireless/Wireline Integration Technologies

Several commenters speculate that the Innovation Technology Joint Venture will be used to develop proprietary technology that will either be forced upon others in the industry or used to impose interoperability barriers with others in the industry.⁴⁸ For example, Public Knowledge suggests that the size of the MSOs and Verizon Wireless would guarantee early adoption of technologies created through the Innovation Technology Joint Venture, thereby forcing others to follow suit and adopt the new technology.⁴⁹ But mere speculation concerning future misdeeds cannot override the competition authorities’ accepted approach to evaluating R&D ventures.

⁴⁶ CWA & IBEW at 14 (asserting that “offer[ing] multiple services to . . . consumer[s] . . . at a discount” and, thereby, gaining new customers from competitors, somehow constitutes unfair competition).

⁴⁷ See *Brunswick Corp. v. Pueblo Bowl-O-Mat, Inc.*, 429 U.S. 477, 487 (1977) (“Every merger of two existing entities into one . . . has the potential for producing economic readjustments that adversely affect some persons. But Congress has not condemned mergers on that account; it has condemned them only when they may produce anticompetitive effects.”); *Monfort of Colorado, Inc. v. Cargill, Inc.*, 479 U.S. 104, 117 (1986) (“To hold that the antitrust laws protect competitors from the loss of profits due to such price competition would, in effect, render illegal any decision by a firm to cut prices in order to increase market share. The antitrust laws require no such perverse result, for [it] is in the interest of competition to permit dominant firms to engage in vigorous competition, including price competition.”) (internal quotation marks omitted).

⁴⁸ Public Knowledge at 21, 40–41; RCA at 38; see *Hawaiian Telcom* at 18; CWA & IBEW at 19.

⁴⁹ Public Knowledge at 21, 40–41.

First, commenters ignore the realities of the marketplace, in which firms like Apple, Google, and Microsoft have been developing wireless/wireline integration technology for years.⁵⁰ Several of these firms have recently agreed to acquire large portfolios of intellectual property that pertain to wireless technology.⁵¹ The Innovation Technology Joint Venture will not have a monopoly on creativity and innovation. The Applicants are under no obligation to limit their purchases of technology to that developed by the Joint Venture. And Applicants have incentives to promote the use of their networks to enhance the value to consumers. As a result, other technology companies will still be able to “build a better mousetrap” – secure in the knowledge that, if they develop worthwhile applications, they will be able access plenty of potential customers. The Applicants’ customers will be able to download and enjoy these applications, because Applicants are committed to maintaining open networks. Indeed, Applicants will have every incentive to promote new applications, as they enhance the value of the networks themselves. The Innovation Technology Joint Venture represents a modest effort

⁵⁰ Press Release, Google Inc., Industry Leaders Announce Open Platform for Mobile Devices (Nov. 5, 2007), http://www.google.com/intl/en/press/pressrel/20071105_mobile_open.html (discussing Open Handset Alliance, Android, and the intersection of wireless and Internet technologies); Press Release, Google Inc., Sprint and Google Expand Relationship to Enable Richer Mobile Experience and More Choices for Sprint Customers (May 7, 2008), http://www.google.com/intl/en/press/pressrel/20080507_sprint_mobile.html (discussing improvement of “mobile Internet experience” on Sprint devices); Press Release, Apple Inc., Apple Launches iPad (Jan. 27, 2010), <http://www.apple.com/pr/library/2010/01/27Apple-Launches-iPad.html> (discussing “a revolutionary device for browsing the web, reading and sending email, enjoying photos, watching videos, listening to music, playing games, reading e-books and much more”). *See also* Press Release, Marvell Tech. Group Ltd., Marvell Announces Wireless / Wireline Integrated Packet Processor for GE Market (May 3, 2005), <http://www.marvell.com/company/news/pressDetail.do?releaseID=510>.

⁵¹ Press Release, Google Inc., Google to Acquire Motorola Mobility (Aug. 5, 2011), <http://investor.google.com/releases/2011/0815.html>; Press Release, Dep’t of Justice, Statement of the Department of Justice’s Antitrust Division on Its Decision to Close Its Investigations of Google Inc.’s Acquisition of Motorola Mobility Holdings Inc. and the Acquisitions of Certain Patents by Apple Inc., Microsoft Corp. and Research in Motion Ltd. (Feb. 3, 2012), <http://www.justice.gov/opa/pr/2012/February/12-at-210.html> (approving Google’s acquisition of Motorola Mobility).

to participate in this highly competitive innovation marketplace. To the extent that the Innovation Technology Joint Venture succeeds in creating innovative products or services, consumers will benefit.⁵²

Second, Congress and the federal antitrust agencies have recognized that research and development collaborations like the Innovation Technology Joint Venture are generally procompetitive. In particular, to ensure that the antitrust laws do not inappropriately deter procompetitive R&D joint ventures, Congress adopted the National Cooperative Research Act of 1984 (as amended),⁵³ which provides that such ventures are not illegal *per se*, and are subject to only single damages (rather than the usual treble damages) in antitrust lawsuits.⁵⁴ The parties have made the required filing with the DOJ and FTC so as to benefit from the provisions of this Act. The DOJ and FTC have likewise recognized that R&D joint ventures are typically procompetitive. In the *Competitor Collaboration Guidelines*, they explain that “[t]hrough the combination of complementary assets, technology, or know-how . . . [joint ventures] enable participants more quickly or more efficiently to research and develop new or improved goods,

⁵² Research agreements among competitors occur in other industries as well. For example, in August 2011, Ford and Toyota announced a deal to “co-develop a hybrid powertrain for rear-wheel-drive light trucks and SUVs,” which will allow the companies to share development costs while continuing to compete “truck for truck.” Martin LaMonica, CNET NEWS, *Why the Ford-Toyota Tie-Up Is a Big Deal* (Aug. 22, 2011), http://news.cnet.com/8301-11128_3-20095547-54/why-the-ford-toyota-hybrid-tie-up-is-a-big-deal/.

⁵³ As explained by the Progressive Policy Institute, the Act was “designed to promote innovation, facilitate trade, and strengthen the competitiveness of the United States in world markets.” Comments of Progressive Policy Institute at 1 (quoting Dep’t of Justice Antitrust Division, Filing a Notification Under the NCRPA, <http://www.justice.gov/atr/public/guidelines/ncrpa.html>). The goals of the Act are even more pertinent today, where “[t]he single most vibrant part of [the] economy is the communications sector” which has “generate[d] almost a half million jobs, while the rest of the economy has stagnated.” Progressive Policy Institute Comments at 1 (citing Michael Mandel, “Where the Jobs Are: The App Economy,” TechNet, Feb. 7, 2012, *available at* <http://www.technet.org/wp-content/uploads/2012/02/TechNet-App-Economy-Jobs-Study.pdf>).

⁵⁴ 15 U.S.C. § 4301, *et seq.*

services, or production processes.”⁵⁵ The DOJ has repeatedly endorsed the procompetitive benefits of R&D joint ventures in multiple industries.⁵⁶

Third, the Innovation Technology Joint Venture is not different in concept from joint development activities undertaken by other telecommunications companies, including some commenters. For example, Sprint already offers “integrated wireless and wireline solutions,”⁵⁷ and it has been able to do so in part because of its collaborations with other industry participants.⁵⁸ From Bellcore to CableLabs, the U.S. economy has benefitted from the fruits of innovative joint research. The prospects of innovation in the wireless/wireline broadband

⁵⁵ Dep’t of Justice & Fed. Trade Comm’n, ANTITRUST GUIDELINES FOR COLLABORATIONS AMONG COMPETITORS § 3.31(a) (2000), *available at* <http://www.ftc.gov/os/2000/04/ftcdojguidelines.pdf>. “R&D exhibits positive spillovers that allow others beyond the innovator to benefit from R&D investment, [but] firms may underinvest in it from society’s perspective.” Technology Policy Institute Comments at 17. “One way to mitigate this market failure is to allow firms to pool resources through research joint ventures.” *Id.*

⁵⁶ *See, e.g.*, Press Release, Dep’t of Justice, Justice Department Approves Petroleum Exploration and Production Joint Research and Development Proposal (Apr. 23, 1997), <http://www.justice.gov/opa/pr/1997/April97/166at.htm> (approving R&D joint venture among Amoco, Arco, Exxon, Mobil, Shell, Texaco and Texas A&M University relating to oil exploration and production and stating that, “to the extent that the cooperative in fact engages in research efforts that would not be undertaken by individual firms, the joint venture may have the procompetitive effect of promoting innovation” (quoting Joel I. Klein, Ass’t Atty. Gen., Antitrust Division)).

⁵⁷ Sprint, Sprint Convergence: Integrated Network Solutions for Unified Communications, <http://convergence.sprint.com/> (last visited Mar. 1, 2012); *see* Matt Hamblen, PCWORLD, *AT&T Announces Integration of Wired and Wireless* (Apr. 19, 2007), http://www.pcworld.com/businesscenter/article/130933/atandt_announces_integration_of_wired_and_wireless.html (“AT&T says that it has integrated wire-line and wireless services and devices to its midsize and large business customers.”).

⁵⁸ Press Release, BroadSoft, Inc., Sprint Introduces Wholesale Mobile Integration (Sept. 13, 2010), <http://www.broadsoft.com/news/2010/sprint-introduces-wholesale-mobile-integration/> (“Wholesale Mobile Integration enables Sprint’s wholesale customers to deliver a converged solution to their business customers, integrating their wireline and wireless voice networks” and “[b]y collaborating with BroadSoft, the leading global provider of application server technology that enables fixed-line, mobile and cable service providers to deliver voice and multimedia services over their IP-based networks, Sprint will extend its reach to U.S.-based carriers that do not currently have wireless networks.”).

frontier present exciting possibilities that can benefit from the Innovation Technology Joint Venture.

H. The Commercial Agreements Will Not Affect the MSOs’ Backhaul Pricing or Private Line Services

Rural Cellular Association (“RCA”) asserts that the Agency and Reseller Agreements, somehow “raise . . . question[s] of whether the [MSOs] have an incentive to continue to provide . . . wireless carriers [other than Verizon Wireless] with competitive offerings in the backhaul and special access markets.”⁵⁹ Sprint likewise questions whether the Agency and Reseller Agreements will stifle competition on backhaul and private line services between the MSOs and Verizon Telecom.⁶⁰ Free Press claims, without citing any provision of any agreement, that the Commercial Agreements require that “Verizon [must] choose Comcast if it is in need of third party backhaul services.”⁶¹

These criticisms have no factual basis – either in the Commercial Agreements or elsewhere. The only provision relevant to backhaul establishes that **[BEGIN HIGHLY CONFIDENTIAL]**

[END HIGHLY CONFIDENTIAL] Nothing in the Commercial Agreements *requires* the MSOs to provide backhaul services to Verizon Wireless on any terms. The MSOs will continue to have every economic incentive to market their backhaul services to a range of prospective customers, including not only Verizon Wireless, but also Sprint, AT&T, T-Mobile, and others. Further, to the extent that Verizon Wireless does

⁵⁹ RCA at 58; NTCH at 12.

⁶⁰ Comments of Sprint Nextel Corporation (“Sprint Nextel”) at 10–12.

⁶¹ Free Press at 47.

⁶² *See, e.g.*, Comcast Agent Agreement § 3.9.

purchase backhaul services from the MSOs, such purchases will only strengthen a competitor to ILECs and CLECs in this space and thus enhance competition overall.

There is nothing in the Commercial Agreements relating to or affecting competition between Verizon Telecom and the MSOs in the provision of backhaul services or private line services to other wireless providers. As noted, Verizon Telecom is not even a party to the Commercial Agreements. RCA and Sprint never provide any explanation for how Commercial Agreements between the MSOs *and Verizon Wireless* could impair competition between the MSOs *and Verizon Telecom* in these services. Nothing in the Agreements prevents Verizon Telecom from successfully competing for backhaul business, and nothing requires the MSOs to grant Verizon Wireless preferential treatment over other customers for backhaul service. Speculative assertions are insufficient to raise a public interest objection to the Commercial Agreements.

I. The Commercial Agreements Do Not Dictate Verizon Wireless’s Data Roaming Policy

Sprint suggests that the Commercial Agreements must be reviewed to determine whether they will affect data-roaming policy.⁶³ Yet it notes from the outset that the Commission has already adopted rules governing roaming obligations for wireless data,⁶⁴ and that litigation on those rules is ongoing.⁶⁵ Given these circumstances, Sprint’s speculation on data roaming policy at some future point is not transaction specific and not an issue in this proceeding. There are

⁶³ Sprint Nextel at 13–16; *id.* at 14 (“For instance, will data roaming agreements become even more difficult to negotiate in the future? Will the Verizon/Cable Company agreements foreclose the possibility that any other carrier could ever build a competing system using the spectrum that Verizon is acquiring?”).

⁶⁴ Sprint Nextel at 13.

⁶⁵ *Cellco Partnership v. Fed. Comm’n Comm’n*, Nos. 11-1135 & 11-1136 (D.C. Cir. May 13, 2011).

many factors are outside the scope of the proposed transactions that come into play, including the current litigation over the Commission’s data roaming rules and the exceptions to data roaming obligations (the inquiries into technological compatibility and feasibility), and thus the issues should continue to be addressed through proceedings of general applicability and subsequent review by the courts.⁶⁶

J. The Commercial Agreements Do Not Prohibit Verizon Wireless From Selling Over-the-Top Video Service or Verizon Telecom From Promoting Such Services

Free Press claims that the Agency Agreements prohibit “Verizon Wireless from selling *any* over-the-top video service (except FiOS)” and prohibit “Verizon . . . from even *promoting* over-the-top video applications like Netflix.”⁶⁷ Both claims are false.

The provisions of the Agency Agreements apply only to the parties to those agreements – Verizon Wireless and the MSOs. Nothing restricts Verizon Telecom’s sales or promotion activities. Indeed, on February 6, 2012 – nearly two months after Verizon Wireless entered into the Agency Agreements – Verizon Telecom and Coinstar, Inc. announced the formation of a joint venture that would offer consumers, among other things, a “new content-rich video-on-demand streaming and download service from Verizon.”⁶⁸ Accordingly, Free Press’s claim that the Agency Agreements prohibit “Verizon” from selling or promoting over-the-top video applications is demonstrably untrue.

Free Press’s claims regarding limits on Verizon Wireless’s sale and promotion of over-the-top video services are likewise untrue. Free Press claims that the Agency Agreements

⁶⁶ Sprint Nextel at 15 (citing 47 C.F.R. § 20.12(e)(1)).

⁶⁷ Free Press at 45 (emphases in original).

⁶⁸ Press Release, Verizon Commc’ns, Verizon and Coinstar’s Redbox Form Joint Venture to Create New Consumer Choice for Video Entertainment (Feb. 6, 2012), <http://newscenter.verizon.com/press-releases/verizon/2012/verizon-and-coinstars-redbox.html>.

prohibit “Verizon Wireless from selling *any* over-the-top video service (except FiOS).”

[BEGIN HIGHLY CONFIDENTIAL]

[END HIGHLY CONFIDENTIAL] Nothing in the agreements *in any way* limits the content that Verizon Wireless customers may access using their wireless devices. Free Press’s hyperbolic claims lack any factual basis.

CONCLUSION

In conclusion, the Commercial Agreements pose no plausible threat to competition or to the public interest. Indeed, many commenters who level such criticisms are competitors of the Applicants who, while professing concerns about diminished competition, are truly concerned by the enhanced competition and consumer choice that the Commercial Agreements will bring.

⁶⁹ **[BEGIN HIGHLY CONFIDENTIAL]**

[END HIGHLY CONFIDENTIAL]

CERTIFICATE OF SERVICE

I, Neil Alan Chilson of Wilkinson Barker Knauer, LLP, hereby certify that the foregoing Joint Opposition to Petitions to Deny and Comments (Redacted – For Public Inspection) was served this second day of March, 2012, by depositing a true copy thereof with the United States Postal Service, first class postage pre-paid, addressed to the parties listed below. Courtesy email copies were also sent where email addresses were available, as also indicated below.

Kevin J. Martin

kmartin@pattonboggs.com

Monica S. Desai

mdesai@pattonboggs.com

PATTON BOGGS LLP

2550 M Street, NW

Washington, D.C. 20037

(202) 457-7535

*Counsel for COMMUNICATIONS WORKERS OF
AMERICA AND THE INTERNATIONAL
BROTHERHOOD OF ELECTRICAL WORKERS*

William M. Wiltshire

wwiltshire@wiltshiregrannis.com

Michael Nilsson

mnilsson@wiltshiregrannis.com

WILTSHIRE & GRANNIS LLP

1200 Eighteenth Street, NW

Washington, DC 20036

(202) 730-1300

Counsel for DIRECTV, LLC

Derek Turner

dturner@freepress.net

FREE PRESS

501 Third Street N.W., Suite 875

Washington, D.C. 20001

(202) 265-1490

Wendy M. Bittner, Esq.

LAW OFFICES OF WENDY M. BITTNER

15 Court Square, Suite 300

Boston, MA 02108

(617) 624-0200

Counsel for SYSTEM COUNCIL T-6

Eric J. Branfman

eric.branfman@bingham.com

Frank G. Lamancusa

frank.lamancusa@bingham.com

BINGHAM MCCUTCHEN LLP

2020 K Street, NW

Washington, DC 20006

(202) 373-6000

*Counsel for HAWAIIAN TELCOM
COMMUNICATIONS, INC.*

Richard Bennett

rbennett@itif.org

INFORMATION TECHNOLOGY AND

INNOVATION FOUNDATION

1101 K St N.W.

Suite 610

Washington, DC 20005

Jason A. Llorenz, Esq.

HISPANIC TECHNOLOGY AND

TELECOMMUNICATIONS

PARTNERSHIP (HTTP)

906 Pennsylvania Avenue SE

Washington, DC 20003

(202) 270-7391

Robert F. O'Brien, Esq.

robrien@obbblaw.com

O'BRIEN, BELLAND & BUSJINSKY, LLP

1526 Berlin Road

Cherry Hill, NJ 08003

(856) 795-2181

*Counsel for INTERNATIONAL BROTHERHOOD
OF ELECTRICAL WORKERS, LOCAL 827*

Mr. Maneesh Pangasa
3562 South 18th Avenue
Yuma AZ 85365-3937
(928) 446-8999

Carl W. Northrop
cnorthrop@telecomlawpros.com
TELECOMMUNICATIONS LAW
PROFESSIONALS PLLC
875 15th Street, NW, Suite 750
Washington, DC 20005
(202) 789-3113
Counsel for METROPCS COMMUNICATIONS, INC.

Stefanie A. Brand
Christopher J. White
NEW JERSEY DIVISION OF RATE COUNSEL
P.O. Box 46005
Newark, NJ 07101
(973) 648-2690

Donald J. Evans, Esq.
evans@fhhlaw.com
FLETCHER, HEALD & HILDRETH, PLC
1300 North 17th Street, Suite 1300
Arlington, VA 22209
(703) 812-0400
Counsel for NTCH, INC.

Dr. Michael Mandel
mmandel@progressivepolicy.org
PROGRESSIVE POLICY INSTITUTE
1401 L St. NW, Suite 1250
Washington, DC 20005

Harold Feld
hfeld@publicknowledge.org
PUBLIC KNOWLEDGE
1818 N Street NW, Suite 410
Washington, DC 20036
(202) 861-0020

Michael Lazarus
mlazarus@telecomlawpros.com
Andrew Morentz
amorentz@telecomlawpros.com
TELECOMMUNICATIONS LAW
PROFESSIONALS PLLC
875 15th Street, NW, Suite 750
Washington, DC 20005
(202) 789-3120
Counsel for RCA - THE COMPETITIVE CARRIERS ASSOCIATION

Edyael Casaperalta
edyael@ruralstrategies.org
CENTER FOR RURAL STRATEGIES
46 East Main Street
Whitesburg, KY
(956) 457-6126
Counsel for RURAL BROADBAND POLICY GROUP

Caressa D. Bennet
cbennet@bennetlaw.com
Michael R. Bennet
mbennet@bennetlaw.com
Daryl A. Zakov
dzakov@bennetlaw.com
BENNET & BENNET, PLLC
4350 East West Highway, Suite 201
Bethesda, MD 20814
(202) 371-1500
Counsel for RURAL TELECOMMUNICATIONS GROUP, INC.

Scott Wallsten
scott@wallsten.net
TECHNOLOGY POLICY INSTITUTE
1099 New York Avenue, NW
Suite 520
Washington, DC 20001
(202).828-4405

Antoinette Cook Bush
antoinette.bush@skadden.com

John M. Beahn
john.beahn@skadden.com

David H. Pawlik
david.pawlik@skadden.com
SKADDEN, ARPS, SLATE, MEAGHER & FLOM
LLP

1440 New York Avenue, NW
Washington, DC 20005
(202) 371-7000
Counsel for SPRINT NEXTEL CORPORATION

Arthur V. Belendiuk, Esquire
abelendiuk@fccworld.com
SMITHWICK & BELENDIUK, P.C.
5028 Wisconsin Avenue, N.W.
Suite 301
Washington, D.C. 20016
(202) 363-4559
*Counsel for THE DIOGENES
TELECOMMUNICATIONS PROJECT*

Randolph J. May
rmay@freestatefoundation.org

Seth L. Cooper
FREE STATE FOUNDATION
P.O. Box 60680
Potomac, MD 20859
(301) 984-8253

Samuel Kang
samuelk@greenlining.org
Stephanie Chen
stephaniec@greenlining.org

Enrique Gallardo
enriqueg@greenlining.org
Paul S. Goodman
GREENLINING INSTITUTE
1918 University Ave
Berkeley CA, 94704
(510) 926-4004

Andrew D. Lipman
andrew.lipman@bingham.com

Jean L. Kiddoo
jean.kiddoo@bingham.com
BINGHAM MCCUTCHEN LLP
2020 K Street, N.W.
Suite 1100
Washington, DC 20006-1806
(202) 373-6034
Counsel for T-MOBILE, USA, INC



Neil Alan Chilson
Associate
WILKINSON BARKER KNAUER, LLP